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THE

ART OF WINE-MAKING,

IN ALL ITS BRANCHES.

BY DAVID BOOTH,

AUTHOR OF THE ART OF BREWING, THE *FIRST* AND *SECOND PARTS* OF
WHICH WERE PUBLISHED UNDER THE SUPERINTENDENCE OF THE
SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE.

TO WHICH IS ADDED

AN APPENDIX, CONCERNING CIDER AND PERRY.

LONDON:

F. J. MASON, 444, WEST STRAND.

1834.

LONDON:

—
R. WATTS, PRINTER, CROWN COURT, TEMPLE BAR.

PREFACE.

BREWING and WINE-MAKING are sister arts ; and, when the present work was written, it was intended as a continuation of the Two Parts of *The Art of Brewing* which were then published by the Society for the Diffusion of Useful Knowledge. The general principles, and many of the manipulations of the two arts, being similar, a number of terms are equally applicable to both ; and, in the contemplated succession of the Treatises, to have repeated in the *Wine-Making* what had already appeared in the *Brewing*, would have been an unwarrantable tautology. The Saccharometer, too, is as requisite in the preparation of the *must*, and management of the fermentation of British Wine, of every species, as for Ale ; but the description of that instrument, and the method of using it, could scarcely have been sufficiently exemplified, if separated from the Brewery.

The Four Parts of *The Art of Brewing*, and the two following of *Wine-Making*, with the Appendix on *Cider* and *Perry*, may therefore be considered as one continued work, embracing a general system for the manufacture of vinous liquors.

DAVID BOOTH.

CHARLOTTE STREET, BLOOMSBURY,
April 30, 1834.

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THE
ART OF WINE-MAKING.

PART I.

OF WINE-MAKING IN WARM COUNTRIES.

CHAPTER I.

INTRODUCTORY.

IN the several divisions of *The Art of Brewing*, we have confined ourselves to the manufacture of vinous liquors from substances which, not naturally sweet, require the necessary sweetness to be developed, or produced, by some artificial process. We have now to treat of the management of fluids that, being already saccharine, have only to be submitted to the spirituous fermentation. For this purpose, of all known vegetables, the vine is universally acknowledged to be pre-eminent. In those favoured climes where it grows spontaneously to maturity, the prepared produce of this plant appears to have been coeval with the human race. The Poets of every age, from the most remote antiquity, have celebrated its praises: its culture was taught by a divinity; and the juice of its berries, variously concocted, formed the nectar and ambrosia of the gods.

The history of the vine, although sufficiently interesting, would be foreign to our present purpose. The fermentation of its juice is that with which we are here properly concerned; and, unfortunately, the details of that process can be learnt only from the writings, or in the vineyards, of other nations. This plant, a native of Asia, of which France boasts the possession of more than fourteen hundred decided varieties, can scarcely be said to be naturalized in Britain. In fact, its culture has continued on the decline ever since the suppression of the monasteries. On referring to a well-written Chapter

on *Vegetable Substances*, in "The Library of Entertaining Knowledge," we find that wines of no mean quality were formerly made from grapes, ripened in the open air, in England. In addition to the evidence there cited, we may give that of the famous naturalist, Peter Collinson, extracted from his Memorandums, printed in the tenth volume of the Transactions of the Linnæan Society:—"October the 18th, 1765, I went to see Mr. Rogers's vineyard, all of Burgundy grapes, and seemingly all perfectly ripe. I did not see a green half-ripe grape in all this great quantity. He does not expect to make less than fourteen hogsheads of wine."

Dr. Macculloch brings down the practice of making wine from British grapes to a much later period:—"However diminished," says he, "this practice is in modern times, it is by no means extinct. The cottagers in Sussex are in the habit of making wine, almost annually, from the produce of vines trained on the walls of their houses. Many individuals, through various parts of the southern counties, and even as far north as Derbyshire, practise the same with success. But the experiment is well known to have been made for many years on a large scale, and with complete success, at Pains-hill, by the Honourable Charles Hamilton, in a situation, with respect to soil and exposure, of which parallel instances are to be found almost everywhere throughout the country, and produced from land of no value whatever for the ordinary purposes of agriculture*."

Notwithstanding that wine has been, and still is, occasionally made from the grapes of this country, it might not have been considered requisite to write a Treatise exclusively for that kind of manufacture. A great variety of vinous liquors have been annually made from our native fruits. These domestic wines, though banished from the cottage, are still found in the farm-house; and it is the boast of the thrifty housewife, how nearly she has produced the resemblance to the wines of the Continent. We apprehend that we shall more readily discover the means of improving these manipulations, after investigating the mode of fabrication, and the characteristics of the wine which, in any particular case, it is intended to imitate; and, in the course of our inquiries and comparisons, we may, perhaps, be able to recommend a liquor which, independent of a name, may be cheap enough to find its way into the abode of the peasant. As is the case with many other of

* Memoirs of the Caledonian Horticultural Society, Vol. ii.

our manufactures, the makers of British wines for sale, as well as the retailers, are completely under the fangs of the Excise; and even the private gentleman must be especially careful not to have in his possession above a hundred wine gallons of such liquors, if he would avoid the judgment of the Exchequer.

CHAPTER II.

OF FOREIGN WINES, AND THEIR KINDS.

1.—*Of Vineyards.*

THE countries most favourable for the produce of the vine lie between thirty-five and fifty degrees of North latitude; in that zone of the globe which includes the rich vineyards of Spain, Portugal, France, Italy, Austria, Styria, Carinthia, Hungary, Transylvania, and part of Greece. In warmer latitudes, the grapes are scorched into dryness; while further north they refuse to ripen. Climate, however, does not always depend on the vicinity or distance of the line. The Cape of Good Hope, and many parts of South America, though situated in the torrid zone, produce excellent wines, from plants that were carried thither from Portugal and Spain.

Of all the countries above mentioned, the vineyards of France are the most extensive. They occupy about five millions of English acres, being a twenty-sixth part of the whole soil. Their annual produce is reckoned, on an average of years, at nearly eight hundred millions of our imperial gallons of wine, and valued at thirty millions sterling. Of this enormous vintage, about forty-four per cent. is reckoned for home consumption, seventeen for distillation, and thirty-nine per cent. for exportation.

The preceding averages were calculated from official reports, which we have not found for other nations, although they probably exist. Spain and Portugal, in particular, contain numerous vineyards; which are, probably, not forgotten in the fiscal regulations of their respective governments. But it is the quality, not the quantity, of foreign wines in which we are more immediately interested; and that, being too various to be comprehended under a general description, will be best

divided into classes: in doing so, it will be most convenient to assimilate them, as much as their nature will admit, to the varieties of ale, and consequently to the principles of fermentation, formerly explained.

2.—*Species of Wine.*

The juice of the grape, like every other fermentable liquid, contains a portion of sweet, weighable by the saccharometer, and which is attenuated in the tun. The proportion of attenuation, whether in the tun, or after the insensible fermentation in the cask, constitutes marked shades of distinction. Suppose, for example, that we have three casks of the same saccharine fluid: let one of them be fermented until every vestige of sweet is gone; another we shall preserve completely sweet—it shall undergo no fermentation; the third shall be a medium between these—it shall lose half of its saccharum—it shall be half fermented. These differences would form three species of vinous liquors; and these three, though they run into one another, will give the reader some idea of the distinctions which we have in view.

The saccharine juice of the vine, then, according to the mode of its fermentation, may form wine of three different kinds:

1st, It may be preserved with little or no attenuation, so as to form SWEET WINES—the *vins de liqueur* of the French.

2dly, It may be attenuated to the utmost extent, to a state in which the principles of the alcohol have no saccharine sheath or dilution, like the dry wines (*les vins secs*) of the Continent.

3dly, It may acquire a medium state. The attenuation may be stopped half way, so as to leave an agreeable mixture of alcohol and sweet, capable of becoming brisk when confined in the bottle—*les vins moëlleux et mousseux* of the French.

Each of these species requires different modes of management; to which we must attend, when giving the general rules for the fermentation of wines.

3.—*Subdivisions of Species.*

There are three modifications, either of which is applicable to each and all of the three kinds of wine above specified; viz. *colour, flavour, and aroma.*

The colouring principle of the grape resides in its pellicle; so that when the juice only is fermented, without being mixed with the skins and stalks (or *marc*, as the French call them),

the wine is white, although the grape may have been red. When it is wished to have it perfectly colourless, the greatest care is taken to separate the juice from the *marc*, with as little pressure as possible. Notwithstanding, however limpid it may be when new, the wine often acquires colour with age; and this, not only when kept in wood, but even in glass bottles. On the other hand, red wines deposit a part of their colouring in the cask along with the lees; and, "when very old," says Chaptal, "it is not uncommon to see them completely discoloured. The colouring matter is then deposited in pellicles on the sides and at the bottom of the vessels: we see the membranes swimming in the fluid, and troubling the transparency of the liquor." "If," continues the same author, "we expose bottles filled with wine to the sun, a few days will be sufficient to precipitate the colouring principle in large pellicles. The wine neither loses its perfume nor its other qualities. I have often made this experiment on the highly-coloured wines of the South."

With regard to colour, from white to red, there are wines of almost every shade. The famous sweet wine of Cotnar, in Moldavia, which is said, by travellers, to be superior to Tokay, is *green*; and, what would not have been expected, its *greenness*, we are told, becomes deeper and more beautiful with age.

The primary impressions made by a glass of wine upon the organs of taste and smell are, respectively, its *flavour*, and its *aroma* or *perfume*. The corresponding French words, when applied to wine, are *sève* and *bouquet*; terms which we cannot better express than by translating the definitions of M. Jullien*. "This word (*sève*) is generally employed at Bordeaux, and in many other vineyards, to indicate the vinous strength and aromatic savour which are developed to the taste, *embalm* the mouth, and continue to make themselves felt after the passage of the liquor. It is composed of alcohol and aromatic particles, which are dilated into vapour the moment that the wine comes in contact with the warmth of the mouth and stomach: the same quality is also designated by the name of *spirituous aroma*. *La sève* differs from *bouquet* in this, that the latter is disengaged at the instant when the wine is exposed to the air; that it gives no indication of the presence of alcohol; and that it soothes the smell rather than the taste."

The flavour and the aroma of different wines are much

* Topographie de tous les Vignobles connus.

talked of by connoisseurs, who feel, or affect to feel, varieties and distinctions which elude the senses of ordinary men. The real possession of extremely exquisite sensations is not to be envied; and its boast is, unfortunately, too apt to remind us of the iron and the leather of Cervantes.

CHAPTER III.

OF THE CONSTITUENT PRINCIPLES OF THE GRAPE.

THE fruit of the vine, like many other berries, is harsh and acid when green; but acquires a saccharine taste when it arrives at maturity. We have observed, in the Chapter on Fermentation, that the sweet extract of malt is thereby converted into a vinous liquor, which gives out alcohol in the process of distillation. The sweet principle of the ripened grape has the same property. It constitutes the principal part of the expressed juice; and that juice (which is termed *must*) attenuates in the progress of the fermentation, and forms wine, which, in like manner, yields its spirit to the still. Were we to use the term *fermentable* instead of *saccharine* matter, we should have a name that would be applicable to every sweetish substance from which alcohol could be drawn; but the word *saccharum* continually refers us to the sugar of the cane. Whatever they may be to the chemist, all vegetable sweets are identical in the hands of the brewer and the distiller. Their union with other substances may create a flavour unsuited to the views of the former, or present an obstacle to the usually rapid manipulations of the latter; but, as far as the principle is concerned, it matters nothing to either, whether the *saccharum* crystallizes in prisms or in spheres, or even if it has hitherto resisted all attempts to reduce it to a regular and solid form.

It is asserted that *pure* sugar and water will not ferment. We suspect the experiment has never been fairly tried. The same thing has been as confidently said of malt-worts, although the contrary is matter of daily observation. With like confidence it is said, that there exist two kinds of sugar in the *must* (or juice) of the grape; one crystallizable in globes, and decomposable into alcohol; and the other a *sweet principle*, which acts solely as a *leaven*, to promote the fermentation.

"This *sweet principle*," says Chaptal, "is almost inseparable from the *saccharine* (or *sugary*) principle in the products of vegetation. We find them almost everywhere united, and, more or less, intimately combined. The *sweet* and the *saccharine* principle, then, both exist in the same raisin, but in different proportions. There are raisins in which the *saccharine*, and others in which the *sweet*, principle predominates. In the former, the fermentation produces *sugary* wines; because the *ferment* is not in sufficient quantity to decompose all the sugar; and in the latter, if it be prolonged, it produces acid wines: because, from the moment that the sugar is decomposed, the *leaven* and the alcohol exercise their action on the other principles, and develope the acid. In the former case, it is necessary to add *leaven* to continue the decomposition of the sugar, in order to obtain a wine that is very spirituous without excess of sweet; and, in the latter, sugar should be added, for the purpose of increasing the action of the leaven, and of employing it wholly in the production of alcohol."—"The sweet taste exists in gums and in many mucilages that contain no sugar: these two substances, therefore, though similar in flavour, ought to be separated by the chemist, because their effects are very different."—"We ought, then, to consider sugar as the principle which gives place to the formation of alcohol by its decomposition, and the *sweet body* as the true *leaven* of the spirituous fermentation. In order that the *must* may be fitted to undergo a perfect fermentation, it ought to contain these two principles in a proper proportion."

This division of the fermentable substance into two parts, the *saccharine* and the *sweet* principle, has been adopted by the chemists as a theory to account for the formation of alcohol. According to this belief, those opposing *sweets*, which an untutored mind might suppose to be the same, make a continued war upon one another, and *spirit* is the consequence of their mutual destruction. As a prevalent doctrine among scientific men, this theory could not be passed by unnoticed; but we would caution the Brewer or Wine-maker from implicitly adopting, in his practice, this, or any other theory. The present is peculiarly the age of scientific investigation. Most young men who can afford it, and especially those who are intended for any one of the chemical arts, usually attend a regular course of lectures. The lecturer has read many books, and made a few petty experiments, one or two of which he exhibits to his admiring audience. His

knowledge is universal, extending through all the operations of nature. His theories, or rather *guesses*, are received as axioms; and it is this sort of implicit faith of which we would request the student to beware.

Another certain ingredient in the *must* of grapes, which is also found in some other fruits, is *tartar*. This substance is deposited from wine, forming layers upon the sides of the casks, along with the lees or dregs. This crude tartar, or *argol* of commerce, is, when purified, the *cream of tartar* of the shops. It is a tartrate of potash, with excess of acid. Tartar is most abundant in the green grapes, and lessens in proportion as they arrive at maturity. "It seems," says Dr. Macculloch, "essential to the formation of a genuine vinous liquor; and an addition of it, where it is naturally wanting, is found not only to ameliorate the produce, but even to increase the quantity of alcohol which a given proportion of sugar and the vegetable extract is capable of producing. Fermentation is most easily induced where this salt is present; and the experiments of some of the French chemists seem to show that it is decomposed during this process." Of this acid (*the tartaric*) we shall again have occasion to speak.

Taking natural *must* of the highest specific gravity, three-fourths of its volume is aqueous, and does not appear to differ from common water. That element, therefore, may be supposed to act a material part in the process of fermentation. We shall afterwards find that it does so. A small portion of tannin, and, it is said, of malic acid, are sometimes discovered. That extract, which is unfermentable, is deposited with the lees; and appears to have had no share in the operation. Colour, flavour, and perfume, are considered as qualities rather than substances, and are, therefore, not reckoned in the analysis of the *must*.

CHAPTER IV.

OF THE PREPARATION OF THE MUST.

THE preparation of the *must*, in different countries, in different provinces of the same country, and even in different vineyards of the same province, is by no means uniform. The species of grape generally employed, and the degree of maturity which it

reaches on an average of years, induce a variety of management; and added to this, is the purpose for which the wine is applied, whether for distillation, for home consumption, or for exportation. All these are regulated by the nature of the soil and the temperature of the climate, so as not to be included under any determinate rule.

Reverting to the three divisions of wine formerly mentioned, we shall keep their distinctions in view, in the subsequent observations.

When the wine is intended for the still, the object is to ferment the *must* as completely as possible, in order to procure the greatest quantity of alcohol. For this purpose, it is found, by experience, that the specific gravity of the *must* should always be low; and if the expressed juice should weigh above sixteen pounds per barrel, it would be useful in practice to reduce it, by means of water, to that weight. M. Dubrunfant placed, in the same situation, three tuns holding nearly three hundred gallons a-piece, in each of which he put eighty-eight gallons of the same *must*, of forty-five pounds per barrel, at the temperature of 65°. To the tun No. 2 he added eighty-eight gallons of water, and twice that quantity to the tun No. 3, while No. 1 remained unaltered. The water was added at the same heat; so that there were three tuns, each containing the same quantity of the same quality of fermentable matter, differing only in the proportion of water. No. 1 contained 88 gallons of a 45-pound wort; No. 2 contained 176 gallons of a 22½-pound wort; and No. 3 had 264 gallons of wort, weighing 15 pounds per barrel. The fermentation began first in No. 3, then in No. 2, and last in No. 1, at an interval of two hours between each. It was more active in No. 2 than in No. 1, and still more so in No. 3. The fermentation terminated (as judged by the falling of the head) in the following order:

In No. 3, after 30 to 36 hours;

In No. 2, 3 or 4 days; and

In No. 1, 10 to 12 days.

It is evident that the water was the sole cause of the difference in the length of these fermentations; but that addition made also a material difference in the alcoholic produce, the proportions being,

In No. 1, as 90;

In No. 2 95; and

In No. 3 100.

The water, therefore, not only accelerated the tumultuous fermentation, but also favoured the more complete transformation of the sugar into alcohol.

These experiments, although only applicable to distillation, evince the effects of the greater or less quantity of water in the *must*. The fact is, that, above a certain gravity, fermentation proceeds with difficulty, and finishes long before the greater part of the *saccharum* is attenuated. It is from this principle that we have to account for the production and long preservation of those famous sweet and delicious *liqueurs* which are only to be seen on the tables of the great.

M. le Comte Chaptal, to whom, notwithstanding the freedom of our remarks, we, on this subject, owe many obligations, is (as a chemist) peculiarly rational when he speaks of the vintage; by which we understand the period when the clusters should be plucked from the stems. "It has been laid down as a principle (says he), that the time of the vintage is that of the maturity of the raisin; because, in that state, it would furnish, by fermentation, the greatest quantity of alcohol. This general principle, however, is subject to many exceptions; for, in some parts of the north of France, the raisin scarcely ever arrives at maturity; and it is necessary to cut it from the stem before it is ripe, lest it should be destroyed by the cold and humidity of the autumn. In those climates, therefore, we must seize the moment when the raisin can gain nothing more from the stem. There are countries, too, where the wine is required to have properties which are incompatible with the maturity of the fruit. It is often wished to procure a wine of an agreeable flavour, rather than of strength; but this *bouquet* can only exist when the berry is immature. It is sometimes required to fabricate *brisk* wines; and this quality is best produced by making use of the grapes before they have attained complete maturity."—"We cannot even consider the maturity of the raisin as an invariable guide; for in Spain, and other places, raisins are often allowed to dry on the stalk, for the purpose of concentrating the saccharine juice, and forming sweet wines.

When the grapes are ripe, which is generally the most favourable time for the vintage, they lose their hardness, the skin is transparent, and the juice is savoury, sweet, thick, and glutinous; the cluster becomes pendant; its green tail turns brown, and is easily detached from the plant, as the raisins also are from the cluster.

Those who are careful of the character of their wines pick

the raisins with great care, throwing away such as are putrid, and leaving the green to ripen upon the stock. The weather chosen for the operation is dry, and the day advanced, so that no moisture or dew remains on the berry. As large a quantity as is to be fermented in one tun is picked on the same day; and there are generally two or three, and sometimes five or six pickings, of which the first is always the best. There is, however, no determinate rule for the management of the vintage: it differs in different countries, in districts of the same country, and even in neighbouring vineyards.

In the manufacture of wines where the produce is, from soil and climate, necessarily of inferior quality, and in such as are meant to be made into brandy, the immense labour of picking would be useless. In some places, an acerbity of flavour is in request, which cannot be had unless a part, at least, of the raisins is green. In the neighbourhood of Paris, and in the northern departments of France, the grapes never come to perfect maturity; and there the approach of the winter points out the proper period for the vintage. Every degree of ripeness effects a change in the quality of the wine.

On the other hand, the *vins de liqueur*, or sweet wines, require, as already mentioned, a juice that is saccharine in a high degree. In countries which have not to fear the colds of autumn, the ripened grapes are allowed to dry on the stock of the vine. In some parts of Spain, the footstalk of the cluster is twisted, to prevent any further accession of sap to the raisin. The water of its juice is partly evaporated by the heat of the sun, and its remaining acid unites with the mucilage not yet sweetened, and converts it into sugar. This practice, or a process to the same effect, of mellowing the grapes, is usual at Rivesaltes in France, in Calabria, the Isle of Cyprus, and, indeed, in every place that is famed for such wines. In some countries they are spread on rocks exposed to a burning sun; in others they are hung in baskets, for a certain time, in rooms heated by stoves; the effect being in every case the same, viz. the evaporation of a part of the water of vegetation, and a conversion of acid and mucilage into a saccharine substance. This kind of saccharification is of every-day occurrence in some of our native fruits. Many species of apples and pears, though hard and acid when taken from the tree, become soft and sweet by keeping; and the experienced cider-maker accounts it advantageous to allow his *pomage* eighteen or twenty-four hours to mellow, before he carries it to the press. The rich wines, made

from raisins that have been treated in the manner we have mentioned, although often kept for a great number of years, never deposit tartar among their other lees.

Raisins, in our language, are *dried grapes*; each word merely expressing a different state of the fruit of the vine. It is otherwise, however, with the French, who have the same words, but not applied in the same manner. In France, *un raisin* is a single berry of the vine, in whatever state it may be; while *la grappe* (or *la grappe*) is the bunch of raisins as they are connected together upon the vine, and is applicable to any other berries which grow in clusters or *groups*. The stalks of the bunch, when freed from the raisins (*la rafle*), is also occasionally called *la grappe*, and the raisins are then said to be *égrappés*. We have been obliged to enter into these explanations, in order to account for the peculiar use that we have sometimes made of the word *raisin*, and for the purpose of explaining a manipulation (*égrappant*) for which we have not a name.

Whether the raisins should be *égrappés*, or fermented with their stalks, has been the subject of interminable disputes; men, equally enlightened, taking opposite sides of the question, both in theory and practice. "It is true," says Chaptal, "that *la grappe* is harsh and austere; and it cannot be denied, that wines which are made from raisins not *égrappés*, partake of that quality. But there are feeble and almost insipid wines, such as the greater part of those that are made in humid countries, in which the slightly rough flavour of the *grappe* relieves the natural insipidity of the liquor." The opponents of the *égrappage* assert that the *grappe* assists the fermentation when too weak; and, otherwise, that to deprive the *must* of its effects gives the wine a tendency to become *ropy*; a disease not uncommon in wine, and sometimes in ale, by which the fluid becomes tenacious, like oil.

In order to set the juice at liberty for the fermentation, not only the skin, but the whole cellular tissue of the raisin, must be broken. There are various modes of effecting this purpose. The most ordinary way is to put the fruit, as it is brought from the vineyard, into a strong square vessel about four feet wide, which is placed on the top of the fermenting-tun. One or two men, with strong wooden shoes, trample the raisins, the juice passing through the openings between the planks into the tun, and leaving the *marc* (or skins) behind. This *marc* is taken out by lifting off one of the side

planks; and is either thrown into the tun amongst the juice, or put into another reservoir, according as it is meant to be fermented or to be applied to some other purpose. It may be submitted to pressure, and its juice added to what is in the tun. Every successive basket of raisins is trampled in the same manner. There are machines, of various constructions and names, invented to facilitate this operation, which it would be useless to describe in the present work.

CHAPTER V.

OF THE FERMENTATION.

THE *must* being prepared, the tun enters spontaneously into fermentation, in many cases, in a few hours; but the period at which it becomes perceptible varies with the quality of the *must*, and the heat at which it is at first left to repose. The former depends on its gravity, the maturity of the raisin, and the addition, or subtraction, of the skins and *grappe*; and the latter, on the general temperature of the weather, and particularly on the time of day at which the grapes are gathered: for it is said to be well ascertained, that, when gathered in the morning, the fermentation begins more late than when the raisins have been exposed some hours longer to the sun. The juice of the berry seems to be tenacious of the temperature which it carried from the stock. When the first heat of the tun is under 60°, it is usual to raise it, by pouring in boiling *must*, or by other artificial means. About 65° is considered to be the heat best fitted for the fermentation to begin. The heated *must* is carried to the bottom of the tun by means of a funnel of sufficient length. In cold weather, the tun-room is kept up to that degree. We may here add, that the fermenting-vessels (*les cuves*) are not always what we call *tuns*, but are often built of stone, the inside being sometimes lined with brick, and covered with calcareous cement. The circular form is undoubtedly the best; for the consistence of the *must* is such, that the fermentation is often stronger in the centre than at the outer sides of the mass. It is probably on this account, that, in protracted fermentations, the practice

in some places is to rouse the tuns every day, as is done by the Scotch ale-brewers.

All other circumstances alike, the quantity of the *must* has a material effect on the progress of the fermentation. It may indeed be fermented in very small quantities. "I have," says Chaptal, "made it pass through all the periods of its decomposition, in glasses placed on a table; but, generally, the fermentation is so much the more prompt, rapid, tumultuous, and complete, as the mass is more considerable. I have seen *must*, deposited in a cask, not terminate its fermentation until the eleventh day; while a tun, filled with the same *must*, but containing twelve times the quantity, had finished on the fourth. The heat of that in the cask never rose above 70°, whereas the tun rose to 88°. It is incontestable, that the activity of the fermentation is in proportion to the mass. I have seen the thermometer rise to 93° in a tun which contained thirty *muids* of vintage of the measure of Languedoc*."

There are other causes that produce this rapid fermentation and consequent increase of heat. Red wines only are fermented in such large quantities, and these, invariably, contain the *marc* and the *grappe*. White wines are always fermented much more slowly, and never rise to so high a degree of heat. There are instances of their not finishing their first decomposition during a very long period. In 1823, when the saccharine principle was less abundant in the liquid than usual, the white wines of some vineyards in the western departments of France remained in the tuns, in an almost inactive state, from thirty to forty days.

The wine is cleansed into casks when it has ceased working in the tuns; and this period is fixed by different criterions, according to the practice of the several countries, or districts of the same country. Some put a lighted taper close to the surface of the liquor, and cleanse when the taper is not extinguished by the carbonic acid gas. Others trust to the thermometer; and empty their tuns when the heat at the bottom, which is usually warmer, becomes as cool as at the top. A more scientific criterion would be that of our best strong-ale brewers, who judge of the time of cleansing by the saccharometer. When the wine ceases to attenuate, it can gain no advantage by remaining longer in the tun; and should therefore be drawn into the casks, lest the exposure

* Equal to 4526 imperial gallons.

of a large surface to the air should create acidity. The degree of attenuation which it usually acquires, varies with the species of wine. The sweet wines still remain of high gravity, while what are meant for dry wines seldom exceed four or five pounds per barrel. All of them, however, are liable to further attenuation in the cask.

The theory of fermentation, as laid down by Chaptal, is of little value to practical men. His favourite doctrine of a *sweet principle*, distinct from sugar, which he and others assert to be the true *leaven* or *ferment*, is continually uppermost in his discussion, and is all that we learn (if we learn any thing) on the subject. The analysis of vegetables is yet extremely imperfect; and the causes that originate their several modes of fermentation, from their first growth to their final destruction, seem still hid among the arcana of nature. The discovery of this "*sweetish substance* of a *vegeto-animal* nature, and akin to gluten," gives us no insight into the manner of its operation as a ferment. May it not be the first stage of the conversion of mucilage in *saccharum*, acted upon by the acid of the fruit, which a more lengthened action converts into real sugar? The abstract idea of a *ferment* originated with the continental chemists, who found that the juice of fruits went through the vinous change without any extraneous additions; while they believed that the farina of malted grain, though *sweet*, required a portion of *yeast*. We know, however, that the distinction is merely that of *time*. Worts will ferment of themselves, if kept at a certain temperature; and the more readily, if they have imbibed a slight degree of acidity. Oxygen seems to be the grand general agent. The maltster knows that he ought to exclude the light from his malting-floor: it abstracts the oxygen, which is producing the vegetation of the barley, and converting it into *sweet*: and, from a like principle, the farina or starch of the grain is changed into *saccharum* by means of sulphuric acid. But enough of this: we forget that, while we are objecting to one theory, we are propounding another, which perhaps may be equally groundless.

CHAPTER VI.

OF OPEN AND CLOSE TUNS.

IN our *Treatise on Brewing*, we made some remarks on the fermentation of beer, as performed in open or shut tuns. Those observations were, as we judged, sufficient for the brewery; for though a patent was taken out, in 1823, for an apparatus, on the French system, to be adopted by the brewers, distillers, vinegar-makers, and the makers of cider and perry, it does not consist with our knowledge that the use of that patent has been purchased by any intelligent proprietor in either of these branches of manufacture. It has been otherwise, however, in the wine countries, where the high name and influence of Count Chaptal contributed to spread the belief of its paramount utility. It would, therefore, be an unpardonable neglect, in an account of *wine-making*, to leave the practice unnoticed; a practice which promises, in the language of its quack advertisers, “to condense and to return into the fermenting fluid all the aqueous, spirituous, and balsamic vapours, which are usually carried off with the carbonic acid gas; and thereby to enrich the wine, by preserving entire its spirit and perfume. Those patentees also pretend, that there is a saving of from 9 to 15 per cent. in the actual quantity of the wine; whereas it has been proved, by numerous experiments, that the increase of volume from their procedure, beyond that of tuns covered loosely in the ordinary manner (as has been long practised in Champaign and Burgundy), is not above one in two hundred; and this increase is caused by the condensation of all the gas that is evolved during the whole progress of the fermentation. What proportion of this condensation is spirituous has not been determined; but it is probably very small.

The following is a description of this Gervais apparatus:—

ZZ, A A, is the perpendicular and central section of a fermenting-tun, with the apparatus affixed to the close head ZZ.

B is a cone of tinned iron plate, communicating at bottom with the tun, by means of a hole in the cover ZZ.

CC is a small channel extending round the interior base of the cone, being adapted to receive the condensed “*alcohol*

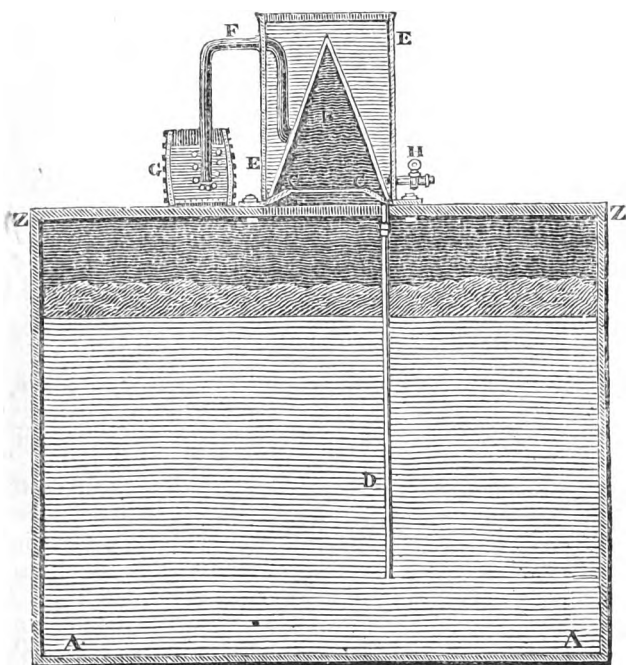
and *essential oils*;" from whence they are conducted, down the small pipe D, into the lower part of the liquor in the vat.

EE is a cylinder of the same material as the cone which it surrounds, and containing cold water for the purpose of condensing the vapours which rise into the cone during the fermentation.

F is an egress-pipe, communicating with the interior of the cone; its extremity being immersed to the depth of six inches, at least, below the surface of the water in the small tub G, from whence the incondensable gases are permitted to escape into the atmosphere.

H is a cock to draw off the water from the reservoir EE when it becomes warm and requires to be replaced with cold water; as is the case in high fermentations.

Fig. 1.



It is asserted by the French chemists, and conceded by Messrs. Deurbrouck and Nichols, the English patentees, that the vinous fermentation will not commence without the access

of atmospheric air or of oxygen; but after it has once begun, the further exposure to the air is unnecessary; and the quantity contained in the empty space (left in the tun to prevent the head from rising into the cone) is, they say, perfectly sufficient to originate the fermentation: but, they add, "as soon as carbonic acid is evolved from the fermenting gyle, the atmospheric air, being lighter, is driven out from the upper part of the working-tun; and, as no air is permitted to enter afterwards, all the subsequent carbonic acid gas emitted diminishes the quantity of oxygen contained in the gyle, by the oxygen uniting with the carbon as fast as it disunites from the saccharine matter during its decomposition, and thereby secures a soundness and peculiar mildness not to be procured by any other mode."

Never having seen the effects of fermentation in tuns thus, as it were, hermetically sealed, we cannot personally join in their praise; but we apprehend that there is one inherent defect, which will always prevent their general adoption in the British brewery;—we mean the tardiness of the progress of the fermentation. From fifteen to twenty days, which, it is granted, would be requisite for the fermentation of table-beer, is a sufficient bar to its adoption. On this principle, we suppose that the Scotch ale-brewers, who, even with open tuns, often take three or four weeks to a gyle, would require the whole of their brewing-season for a single operation.

It will be observed, in the preceding description of the Gervais apparatus, that the extremity of the *egress-pipe* F is immersed in water *to the depth of six inches at least*. These six inches impose an additional pressure upon the surface of the fermenting fluid, equivalent, at an average, to the sixty-fourth part of the whole weight of the atmosphere; and, in consequence, has a material effect in preventing the escape of the carbonic acid, thereby retarding the attenuation. "In fact," says M. Dubrunfaut, "the gas, meeting with a powerful obstacle, which opposes its passage through this condensing apparatus, forces its way by other issues, which it finds in the pores of the wood, and the fissures of the lutes which are recommended to close the joints of the cover of the tun. The portion of gas which thus escapes, by openings that can never be kept closed under such a pressure, subtracts the alcoholic vapours from the refrigerator, and is a fundamental error in the construction of the Gervais apparatus." We may add, that had it even been perfect, it was not new: it was nothing more than a combination of two principles which had been

long known—the condenser of Jean Baptiste Porto, a Neapolitan, which was described in a work on Distillation, published by him in 1609; and the hydraulic valve of M. D. Casbois, which was announced in a French Journal of Sciences and the Arts in 1783.

It will naturally be asked, in this place, whether or not the rise in the barometer, to the extent of about half an inch, would not have the same effect on the vinous fermentation as the Gervais apparatus? We say, that it would have more: for, in the case of an increased weight of the atmosphere, the pressure all around the tun would be equal to that upon the surface of the liquid. One marked difference would be, that there would be no exit through the pores or chinks of the tun; for these fissures would be equally pressed upon by the external atmosphere. We have been long aware that the variations of the barometer are indicative of alterations in fermentative processes of every kind; and we doubt not that a time will arrive, when that instrument will be considered as a necessary appendage to the other instruments which are now consulted by the manufacturers of vinous liquors. Persons who have not attended to this particular subject (and there are few who have) can have no conception of the effects of atmospherical variations. Wine-making is confined to a certain season, and to countries where the variation of the barometer is comparatively small: it is in the regions of the north that those effects are more particularly worthy of observation. On this subject we have made many experiments; but what might be useful as suggestions to a scientific manufacturer, would be here out of place. As long as the mind remains doubtful of the facts, they ought not to be given to the world as *knowledge*.

The author last quoted has proposed a mode of close fermentation, which is free from the errors and absurdities that attach to that of Mademoiselle Gervais; and as it may be useful in the vinous fermentations of this country, and does not interfere with the English patent above mentioned, we take this opportunity of publishing a brief description of the process:—

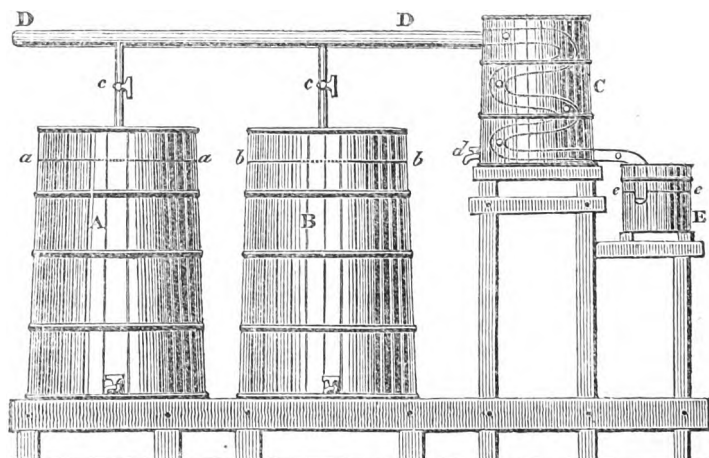
A and B, in the following Figure, represent two of any number of fermenting tuns, which may be arranged and combined together on the same principle. They are here reprinted as of the same size, and as placed on the same horizontal level; but these circumstances, though convenient, are not necessary.

The lines *a a* and *b b* mark the surface of the *must*, or other fermentable liquid.

DD is a pipe, communicating with each tun by means of branches, which are inserted through the close head; and which communication may be stopped at any time, by means of the stop-cocks *c c*.

C is a cask, or other vessel, filled with cold water, through which the pipe DD is continued in the form of a worm *o, o, o, o*: this water may be drawn off, when too warm, by means of the cock *d*, when this refrigerator can be re-filled with cold water, through an opening in the head.

Fig. 2.



E is a smaller vessel, or tub, destined to receive the product of the condensation of the vapours arising from any or all the fermenting tuns. Those vapours, rising in the branch pipes *cc*, into the main DD, pass through the worm *o, o, o, o*, which is bent, when it leaves the refrigerator, into the tub E, reaching half way to its bottom.

It will be obvious, from this arrangement, that the condensable vapours, which arise with the carbonic acid gas, will, by passing through the refrigerator, be collected at the bottom of the tub E in a fluid form, while the upper part of the tub will be filled with gas. Care must be taken to draw off portions of this fluid from time to time (by means of a cock in the bottom of the tub, which is not here represented), so that

it may never rise above the level of the orifice of the worm; for were the fluid, for example, to rise to the level *c, e*, it would, according to its gravity, form an hydraulic valve, which would cause an additional pressure upon the surface of the fermenting liquid;—the prominent objection to the Gervais apparatus.

On this plan, the complex apparatus for each tun is rendered unnecessary; for a single one, of sufficient size, will serve for any number of working tuns. The condensed liquid is not hereby returned to cool the fermenting mass; and the distiller, for whom we should suppose the practice well adapted, might carry the liquid from the tub *E* directly to the still. It may, however, be returned into the mass, by a long-stalked funnel, if desired. The worm gives a free passage to the vapours; since its lower extremity, being plunged only in carbonic acid gas, cannot be said to offer any obstruction. The liquid in the tun is then fermented solely under the simple pressure of the atmosphere; and the carbonic acid gas, finding an easy escape through the opening of the worm, no longer seeks to force a passage through the pores of the wood or the chinks of the tun.

The gas, which, on account of its density, constantly fills the tub *E*, prevents all risk of absorption of atmospheric air as completely as is done by the hydrostatic valve of Gervais. When there is a range of tuns, one or more will be continually discharging carbonic acid gas; but where there is only a single tun, and that not in full operation, the accession of air could be equally well prevented; for it would only be necessary to fill the tub with water until the surface should rise two or three-tenths of an inch above the lower extremity of the worm, as shewn by the line *ee*.

When we want, at any time, to look at the state of a tun, we have only to shut the cock *c* (which shuts out all communication with the others), and, opening a plug-hole in the head, draw off what we require by means of the cock at the bottom. In the same manner we may charge and discharge the several tuns successively, without their interfering with one another. Each may be washed out, by having a *man-hole* in the upper end; or, it may even be taken away, and replaced by another, without retarding the operations of its neighbours. For the more easy performance of this latter purpose, M. Dubrunfaut recommends the following disposition of certain parts in the construction of the apparatus.

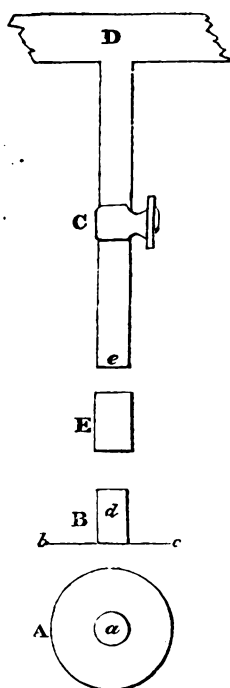


Fig. 3 represents, on a larger scale than that of Fig. 2, the pieces necessary for the purpose above mentioned.

B is a tube and flange, seen sideways, of which A is the face, being a circular plate of the diameter of its section *b c*. This piece is fixed by nailing the disc *b c* upon the head of the tun, in such a manner that the opening *a* corresponds with the hole which is made in the head of the tun, for the purpose of allowing the escape of the gas: the tube *d*, of which *a* is an extremity, being of the same diameter as the hole.

The tube *d*, which is thus perpendicular to the head of the tun, is of the same diameter as the tube *e* of the piece C; and these two tubes, when the apparatus is finished, will be united at their orifices, so as to form a single continued pipe. In order to close completely any little openings between their orifices, the cylinder E, the diameter of which is a little larger than that of the tubes *d* and *e*, is drawn over the junc-

tion, and its extremities are luted to those tubes so as to prevent all access of air or escape of gas. The piece C is previously united to the larger tube D, which here represents a part of DD, Fig. 2. From this disposition of the parts, it is easy to see, that by shutting the cock of the piece C, and pushing upwards the moveable socket E, the tun may be completely disengaged, without affecting any other part of the general arrangement.

We have dwelt the longer on this subject, because of its probable adoption by the distiller and vinegar-maker, for whom we should suppose the close fermentation to be better adapted than to the brewer, or even to the foreign wine-maker. The produce will be found to be very various, according to the heat of the fermentation and the quality of the fermenting fluid. At an average, perhaps, it may be estimated at about the two-hundredth part of the quantity of liquid that is fermented; and in quality, chiefly water mixed with a small portion of alcohol, or, rather, of the immediate materials of alcohol.

CHAPTER VII.

OF SWEET WINES.

SWEET wines differ from all others, by having an excess of the saccharine flavour. They are, in fact, wine and *saccharum*; but, so united by the insensible fermentation, as to possess a very different flavour from that of dry wines mixed with sugar. The latter give us both the flavours, disunited, not intimately combined.

We have already spoken of the preparation of the *must* in this species of wines; but it is only in particular climates that it can be so prepared. A gravity less than fifty pounds per barrel is too weak for the purpose, and such a weight is found naturally in very few places. It may be artificially produced; but the evaporation of its moisture carries off the *bouquet*, or perfume, which, in the judgment of connoisseurs, is three-fourths of its value. The ancients were well aware of the advantages of evaporation; the *vina cocta* of the Romans being exactly the same as the *vino cotto* of Modern Italy. The Greeks concentrated the *must* to such a degree, that their wines required to be mixed with water before they

could be drunk. They were syrups rather than wines, and possessed, in a high degree, the quality of durability; and even the *must* itself had sometimes to be rendered more liquid before it would ferment. In such cases, it seems strange to us that sea-water was preferred. It may be observed, however, that common salt was an ingredient in all the vinous fermentations of former times. The use of large jars instead of casks, and of leathern skins, or flasks, for the conveyance of wine, still prevails in various parts of Greece, notwithstanding the disagreeable flavour thus imparted to the liquor. Before the jars were consigned to the cellar, and finally covered up with earth, the Greeks were accustomed to fumigate them—a practice which was adopted by the Romans. In the island of Cyprus, it is still not unusual to bury a jar of wine at the birth of a child, that it may be reserved for the day of his marriage. The ancients had also other wines for more immediate use; and, generally, manufactured all the species which we do at the present day. There is a Greek work, written in the tenth century, (which a reverend gentleman sometime ago took the trouble of translating into English,) entitled *Geoponica*: it is a collection of agricultural receipts, compiled from various manuscripts, many of which were at that time supposed to be of great antiquity. It would scarcely be fair to suppose the philosophers and wine-makers of Constantinople to have been then as ignorant as those receipts would infer, any more than it would be for a future age to characterize the philosophy and chemistry of the present from the predictions of Moore's Almanack and the brewing directions of a Cookery Book. Certainly, the receipts given in the *Geoponica* for the manufacture of Grecian wines are extremely ridiculous: they are filthy as well as foolish: and if they bore any resemblance to the liquids which were celebrated by the Bard of Teos, he deserved to be choked by a grape-stone.

The qualities of sweet wines which are most sought after are the reverse of those that are dry or highly fermented. The latter have exhausted all their saccharine, while the former require to possess a quantity of unfermented sugar which shews ten to twelve pounds per barrel by the saccharometer. The best kinds weigh about eighteen. Such a proportion of *saccharum* can only be prevented from running into a new fermentation on account of the water in which it exists being already surcharged with spirituous particles, the result of the decomposition of the sugar that has disappeared

in the previous operation ; and the liquor, therefore, may be considered as an approach to a saturated solution of sugar in strong aromatic wine.

There are sweet wines of all colours ; but none, or almost none, of the finest sorts, of either, are to be met with in the market. They are monopolized by the sovereigns of the countries where they are produced, who reserve them for their own use, or as presents to other princes. The beautiful red and highly-perfumed *Lacrymæ Christi*, which is produced at the foot of Mount Vesuvius ; the real *Tokay* of Upper Hungary ; and the green-coloured wine of Moldavia, formerly mentioned ; exist in this country only in name.

The next in estimation grows near Mount Olympus, in the island of Cyprus, and has the name of *Commanderia* ; because that vineyard formerly belonged to one of the *Commanderies* of the Knights of Malta. It is very red when new, but loses its colour gradually as it grows old ; so that in the course of eight or ten years it becomes as pale as the whitest wines of France. The other Cyprus wines are also sweet, and likewise accounted excellent.

The wines of the Cape of Good Hope have deservedly a high character. The two vineyards, called the Upper and Lower *Constantia*, planted with a vine from Persia, produce sweet wines, which, according to M. Jullien, are among the best of the globe, after that of Tokay, to the qualities of which they bear a near resemblance. There are both red and white *Constantias*, the former fetching a rather higher price. The whole produce of these two vineyards, in the most abundant year, does not exceed 20,000 gallons, which is always bought up beforehand ; so that, even at the Cape, it is difficult to procure it genuine. Next to these, the best sweet wines of the Cape are *Muscadines*, but they are usually sold as *Constantias*. The *Muscadines* of Sicily may also be reckoned in the first class of this sort of wines.

We formerly spoke of the manner in which the grapes are treated, when ripening, in Spain ; but even in that complete state of maturity which they almost always attain, the juice, as it issues from the press, does not possess the gravity which their sweet wines require. To remedy this defect, a part of the *must* is concentrated, by boiling it in a cauldron, the size of which depends on the extent of the vineyard. The largest are in the neighbourhood of Seville, and contain about 1700 gallons each. They are circular, widest at top, and much broader than deep. The boiling is continued about forty-

eight hours (scumming it as the feculencies arise), until it is reduced to the fourth part of its original volume. The syrup thus obtained serves to colour the wine, and to give it the strength necessary for its preservation.

The *must* which has not been concentrated by ebullition is passed through a *search*, which separates it from the seeds and skins; and the necessary quantity of the concocted syrup being added, the whole is put into the tun, in order to ferment, where it acquires the requisite spirituousity. Having been deprived of so great a portion of its water, the fermentation soon ceases; and a considerable part of the *saccharum* remains unattenuated. These wines remain sweet, and are even *pasty* during the first two or three years; but they gradually gain purity, flavour, and perfume, as they increase in age. When it is wished to have the wines white, the *must* is mixed with pale brandy, in place of syrup.

The French *Vins de Liqueur* are fabricated in a very different manner from those of Spain. The fine sorts, termed *Vins de paille* (*straw-wines*), come from Colmar, and other vineyards in the department of the Upper Rhine, and from *L'Hermitage*, in Dauphiny. They are so named because originally the raisins of which they were made were spread upon straw for several months before carrying them to the press. In the present practice, when the temperature has been favourable to the vine, the finest and ripest clusters of the best species are tied together with threads, and suspended upon spars, arranged for the purpose, in the upper rooms of the house; the doors and windows being left open as long as there is nothing to fear from the frost. Here they are carefully visited, at least once a week, and the spoiled raisins thrown away. In this state they are left to dry until the month of March, when the *Vin de paille* is usually made. The quantity of juice which is drawn from these half-dried raisins is only about a tenth of what could have been pressed from them at the time of the vintage; but it is very sweet and unctuous; and when fermented, and kept six or eight years, it is said to be little inferior to *Tokuy*. The wines we have been speaking of are those of Alsace; but the *Hermitage* is often sold at a higher price. It is of a gold colour, and remains many years in the casks before it is bottled. The juice of these dried raisins is always fermented without either the *grappe* or the *pellicules*.

The denominations of wines are by no means precise, so as to designate their character with any degree of accuracy.

When the vintage of a certain place has acquired fame, its name is given to imitations made in other quarters. It is the same with the varieties of the vine. That which is found to be excellent in one country is speedily transplanted to another, and almost as speedily degenerates, from not meeting with a congenial soil. The name, however, still remains; and we have *Muscadines*, *Malagas*, *Madeiras*, *Malvoisines*, &c. of almost every country. The last-named vine was carried from *Malvoisia*, a city in the Morea, to *Madeira* and the *Canaries*. The *Malmsey*, so well known in the time of Shakspeare, as well as *Sack*, was usually brought from those islands. His *Sherries-Sack* must have come from Xeres in Spain. Etymologists have derived the word *sack* from the French *sec*, dry; but the supposition is improbable. This favourite liquor of Falstaff differed so far from his wit, that it was not *dry* in itself, although it was the cause that *dryness* was in other men.

CHAPTER VIII.

OF DRY WINES.

DRY wines, *les vins secs* of the French (of which that country produces very few), are such as have the *saccharum* almost completely fermented, so as to constitute fluids lighter than water. The degree of their spirituousity will, therefore, be exactly proportionate to the original gravity of the *must*; and their flavour and odour will depend on this spirit, conjoined with the portion of tartaric acid still retained, and the aroma naturally derived from the species of the vine, or vines, from which it was made, or the artificial perfumes with which it may be impregnated. Their general characteristic is a sharp taste; but those of the best growths possess an agreeable union of spirituousity, flavour, and *bouquet*.

According to the experiments of Chaptal, the specific gravity of the *must* of raisins which have not been dried is between 1058 and 1100; that is, from 21 to 36 pounds per barrel, by the saccharometer. "In general," says that author, "the raisins of the south give a *must* more weighty than those of the north. I have compared the *musts* of all the raisins that are cultivated at the nursery *des Chartreux*, into which,

during my ministry, I had collected plants of all the varieties of the vine that were known in France ; and, after two years of culture, the juice of the raisins furnished by the plants of the south, has had more consistence than that of the plants from the north. In following up these comparative experiments, it would be easy to judge of the influence of climate and of soil : it is more than probable that the raisin of the south will gradually degenerate, and will cease to furnish a juice so sweet and so sugary as in the dry and burning clime of Languedoc or of Provence."

With such differences in the saccharine qualities of the grapes, it is obviously in vain for the Vignerons of one district to attempt to imitate, with success, the wine of another, unless the *musts* could first be reduced to the same consistence. This might be done (and we believe is done) by the introduction of sugar, or other sweet ; but flavour and perfume are more unmanageable ingredients. Dry wines can never be made with *must* of a low gravity. Weak wines, during the insensible fermentation in the casks, are very apt to become acid ; the watery fluid containing too little of alcohol, or its constituents, to prevent the action of oxygen, which changes it into vinegar. To guard against this change in the rich-flavoured, but little spirituous, wines of France, recourse is had to various manipulations, which we shall afterwards describe.

The destruction of the *saccharum* is never complete. The gravity, even when less than water, is no evidence ; because the weight of the sugar is counterbalanced by the lightness of the particles which constitute the alcohol of distillation. Whether or not this fermentable matter is ever completely dissipated, we know not ; but as far as our experience goes, a portion of *saccharum*, less or more, always exists in what are called *vinasses*, or the remains in the bottoms of the stills. When speaking of wines, as *sweet*, *mellow*, and *dry*, we speak of qualities that run into one another, and cannot therefore be minutely ascertained. The extremes, however, are easily distinguished ; and though the softer dry wines of Spain approach to those of the mellow kind, and some of the latter retain a large portion of *saccharum*, yet the first qualities of the dry and the sweet—such, for example, as *Hock* and *Tokay*—are wide as the poles asunder. Nevertheless, in regard to the principle of preservation, both appear to be immortal.

Dry wines are generally the produce of vineyards that lie

between the 47th and the 50th degree of latitude—a space which includes the greater part of Germany. Farther north, the grapes are usually too acerb and immature; and in more southern latitudes, they are found to be too saccharine for the purpose; so that in the islands of the Archipelago the manufacturers introduce water into the *must*, when they make what they choose to call dry wines.

CHAPTER IX.

OF BRISK AND MELLOW WINES.

THESE two preparations of soft wines include the greater part of the exportable produce of France; and the observations of Chaptal and other French writers are chiefly directed to the manufacture of those kinds, or rather varieties of the same kind. *Mellow Wines*—which, as already mentioned, hold the middle rank between the *Sweet* and the *Dry*, having neither the sugary taste of the one nor the piquancy of the other—are principally made between the 39th and 47th degrees of latitude; and, consequently, in the vineyards of France, and in part of those of Portugal, Spain, and Switzerland.

The varieties of French wines, both red and white, are astonishingly numerous. The most celebrated of the former colour are those of Burgundy, the Bordelais, and Dauphiny. The same provinces produce white wines of high estimation; but in these they are rivalled by Champagne, though the red wines of the latter are accounted inferior. We speak here of the most-highly prized, for fine wines are produced in many other provinces; but connoisseurs and dealers advert to every gradation, from the uppermost degree to the lowest of *Ordinary Wines*; that is, of such as are capable of improvement by keeping, and are therefore marketable liquors. With respect to colour, the general divisions are *Red* and *White*; but these have each different shades, according to the length of the fermentation, and the colours of the varieties of the raisins or their pellicles, which are mingled in the tun. The very deep-coloured are called *black wines*; but the greater number are less so, and preserve the name of *red*. There are also rose-coloured, *straw-coloured*, grey, amber, and even yellow wines.

Neither colour nor flavour, however, proceed always from the mixture of raisins in the tun. In very many cases, the wines of different vineyards and different vintages are mixed (or what they term *married*) together, after they have been sulphuretted and clarified in the casks. At Bordeaux, in particular, there are large establishments in which wine is collected, not only from different provinces, but from foreign countries; and kept for years in cellars, both before and after the *marriages* take place. The English houses in that city, soon after the vintages, purchase large quantities of new wines, of various growths, to *prepare* them by what in France is called *le travail à l'Anglaise*. This manufacture consists in putting a quantity of the wine into a second fermentation, during the following summer. This is excited by mixing into every cask (*barrique*), containing sixty-seven of our imperial gallons, from six to eight gallons of Spanish wine, either of the growth of *Alicant* or of *Benicarlo*, half a gallon of white *muet* (a sulphuretted wine, of which we shall again speak), and a bottle of brandy. The wine is allowed to remain until the following December, when it is drawn off into other casks, where it is kept for some years, and then exported. The spirituous quality is much improved by the manipulation and subsequent age. It is in this way that *Claret* is manufactured for the English market: the *Clarettes* of France are pleasant white wines, and sparkle like Champaign. The Spanish of *Benicarlo*, used at Bordeaux, is strong, and of a deep red colour, and known in this country by the name of *Tent Wine*.

The taste of the English for strong wines is also particularly attended to by the exporters of other countries. Most of the wine-merchants in Xeres have distilleries for no other purpose but to make brandy to add to their Sherry. The quantity of this wine, made in the neighbourhood of Xeres, is about 40,000 pipes, of which 7000 are brought to Britain.

The Port wine, of which we consume almost the whole that is shipped from Oporto, is well fermented in the tuns; and when cleansed into the casks, it is mixed with a twelfth part of strong spirits. These are called *Factory* wines, as belonging to the *Company*. The inferior sorts, or *Branch* wines, remain a shorter time in the tuns, and receive a less proportion of brandy. The wine-makers were formerly accused of deteriorating the quality, by using white and weak grapes; making up the strength and colour by artificial means. "The growers (says an old memorial of the English wine-merchants) are in the habit of giving only a few hours' *boiling* to the

wines, and of *dashing* them, in the course of their fermentation, with bad brandy. Now, brandy ought not to be put into wine before the end of November, and the quality of the brandy so used should be good and pure. Another error consists in not separating the white from the red grapes. Where the growers do this, they might dispense with using the elderberry, or any thing in the shape of confection." These, and other remonstrances, induced the Portuguese government, in 1757, to establish, by charter, *The Royal Oporto Wine Company*, with extensive privileges—

1. To lend money to the growers, at a moderate interest.
2. To mark the districts proper for producing the wines for export.
3. To prohibit the use of the elderberry throughout the districts so marked out.
4. To register and mark annually the number of pipes found to be of proper quality for exportation, fixing the prices with a reference to the crop of the season.
5. To form a large depôt, partly to contain wines for sale, and partly for the accommodation of the merchants who might choose to keep stock there.

The salesman is bound by law to accept the offer of the first person who offers him the regulation-price of the season, on which the Company receive a commission of six per cent., but the English merchants are at liberty to purchase below the regulation-price.

CHAPTER X.

OF CHAMPAGNE.

BLACK and white raisins are cultivated indiscriminately in the vineyards destined to furnish white wine. This mixture is of great benefit to those liquors, and particularly to the brisk and sparkling kinds. The first resist, better than the other, the effects of the frost and rains, so frequent at the time of the vintages. They ripen more readily, which is a great advantage when the temperature is cold; but, in warm years, the excess of their maturity renders the colouring parts liable to dissolve in the *first pressures*, and thereby

stain the liquid. They produce a stronger and better-flavoured wine than the white; but the latter, forming a lighter *must*, gives a greater degree of briskness. Mixed in certain proportions, they produce the best and most esteemed.

The preparation of the *must*, by trampling the raisins as formerly described, is generally practised; and even in some vineyards of Champagne when making red wines, but the white exacts more attention. The grapes, after being carefully picked, are carried to a press in large baskets. The quantity collected through the day is put in the evening into the press, the size and force of which is proportioned to that of the vineyard, and may produce from two to four hundred gallons of juice. The operation of *pressurage* is performed as rapidly as possible, and only with two or three *squeezes*, according as the liquor (which passes into a tun) comes sweet and transparent from the press. These first pressures make the *choice* wine. The two or three succeeding pressures are slightly coloured, well tasted, and stronger than the former, but they are fermented separately. The last pressures, without being precisely red, are no longer considered as white, and are employed to give body to coloured wines. By means of further pressure, conjoined with other manipulations (such as cutting and digging it with a shovel), the marc is rendered perfectly dry, and almost as hard as a stone.

The marc is put to various uses. In some vineyards it is thrown into casks and covered with water, which filters through the mass and extracts the remaining juice. In this case, it does not undergo the last pressure, and produces a weak drink for the labourers. When the husks, &c., are fermented in the tun (in which they are deposited after the wine is cleansed, along with the leaven and other impurities), they are pressed and made into small wine in the same manner, provided they shew no signs of acidity: if they do, their *pressures* are made into vinegar. In some provinces, the marc, when completely exhausted of its juice, is preserved, to be afterwards dissolved in warm water, and mixed with straw, turnips, &c., to be eaten by cattle and horses. In other parts it is burnt for the sake of its alkali.

When rose-coloured wines are required, the raisins are first *égrappés*, and slightly bruised in vessels appropriated for the purpose, where they are allowed to remain until an incipient fermentation, dissolving the colouring matter, gives the requisite tint; after which, they are carried to the press and squeezed in the same manner as for white wine, excepting

that all the *pressures* are fermented together in the same tun. Others produce the rose-colour by the introduction of a liquor which is called *Vin de Fimes*, because it is made in a town of that name. It is the juice of elder-berries boiled with cream of tartar, and filtrated. A few drops of this liquid will give the rose-tint to a bottle of white wine, without affecting its taste or salubrity. The colour is more beautiful and more durable than what is acquired by the fermentation above mentioned.

The *choice* white wine "*must*" is left all night in the tun to deposite; from which it is removed next morning, into puncheons that have been previously prepared and sulphured. There it first enters into a tumultuous fermentation, which soon gives place to one that is insensible. About the end of December, if the wine has wrought well, it becomes clear; and, in dry and frosty weather, it is racked and fined by means of isinglass. The liquor enters again into a slight fermentation; and in a month or six weeks after, it is racked and fined a second time.

Wines that are intended to be brisk should be bottled in the following March; but, as the fermentation is not wholly terminated at this period, it continues to work in the glass, in a way similar to what occurs in our early-bottled ales. This, which we should call *ripening*, commonly commences in the month of May, and continues through the summer. It is strongest in the month of June, when the vine is getting into flower; and in August, when the grapes begin to ripen. It is at these periods that the proprietors incur the greatest loss, from the breaking of their bottles; and it is imprudent to go through a cellar where those bottles are deposited, without being covered by a mask of iron wire. Workmen, who are apt to neglect this precaution, are often grievously wounded by the splinters of the glass, which fly like bomb-shells. This fermentation diminishes in the autumn, and it is seldom that any serious accident happens in the second year. The proprietors usually calculate upon a loss of fifteen to twenty per cent. from the breaking of bottles; and sometimes it amounts to double that proportion. There is also a material loss in *decanting* the bottles in order to render them perfectly limpid, by freeing them from their deposits. This operation is performed twice at least, before exportation; after which, the wine may be kept fifteen or twenty years without sustaining any further alteration.

Among the wines that are prepared in this manner, there

are some which are brisk only in a slight degree. These are said to be *creamy* or *half-brisk*, throwing out the corks with less force, sparkling less in the glass, and their froth, when poured out, covering the surface, but flying off in a moment. These have the advantage of better preserving their vinous qualities, and of being softer to the taste than very brisk and sparkling wines.

These much-valued properties of Champagne may, in a general view, be ascribed to the degree of compression in which its carbonic acid exists, and the *semi-alcoholic* or other particles with which it is partially combined. The degree of compression is influenced by the extent of the close fermentation which it has undergone; and the manner of its issue will depend on the gravity of the liquor. In bottled strong ale, the acid which is generated is held more firmly in solution; and the liquor mantles, but does not fly. In bottled small beer, if it can be preserved sufficiently weak, we see an imitation of the briskness of champagne, though without its vinous savour. On these principles we may account for some of the phænomena which are considered by M. Jullien as inexplicable. That wines, at first perfectly brisk, should lose that quality by a change of season, is not to be wondered at. A new combination of its component parts is induced by the operation of caloric upon the liquid, or even upon the expansion or contraction of the glass in which it is contained. That, of bottles from the same glass-house, filled on the same day, with the same wine, placed in the same cellar and on the same bin, some should become lively, and others remain dull, is an observation of every-day occurrence, in the bottling of beer. A barrel of ale, containing fifteen or sixteen dozen of bottles, may be drawn off in two hours; and yet, during that short period, the admission of the atmospheric air renders the last-filled bottles longer in ripening than the first. Besides, strictly speaking, no two bottles are exactly under the same circumstances, in any respect: for example, they can never hold the same place in the bin, nor is the glass equally thick. The quantity of atmospheric air between the cork and the liquor cannot be measured by atoms; and the elasticity of the cork of one may be such as to give a little way, while that of another shall obstinately resist the expansion of the gas.

There are, however, other phænomena described by that gentleman, for which our philosophy cannot account. "The quality of the substances," says he, "of which the bottles are

made, and perhaps, also, the degree of heat which they have undergone, contribute to diminish or to preserve the liveliness of the wines of Champagne. We are even assured that this phænomenon extends to the very glasses from which it is drunk; and that in some of these the wine will instantaneously lose all fermentation, while it will preserve its briskness in others that are filled at the same time. It is probable," he continues, "that the glasses which produce this effect are those in which there is either an excess or a bad combination of alkaline parts, which, in that case, absorb the carbonic acid contained in the wine."

CHAPTER XI.

ON THE PROPER PREPARATION OF THE CASKS.

WHEN the ale-brewer has cleansed his ale, and attended a few days to its lesser fermentation, he bungs up his casks; and, except seeing now and then that they do not leak, he generally considers his brewing as finished, and waits with patience for the result. This is not the case with the wine-maker. In France, especially, he has much subsequent labour to perform. His wine has to be racked frequently from one vessel to another; and the amount of the insensible fermentation is to be guided with the utmost care.

The minute attention which is bestowed in preparing and cleaning the casks is deserving of imitation in this country. If a cask has stood empty even for a few days, a lighted match, or a piece of strong burning paper, is introduced at the bung; and if the light is quickly extinguished, it is concluded that the wood has imbibed acidity. In this case, it must be purified. For this purpose a pair of bellows, the nozzle of which is tapered to fit the bung-hole, is made use of to blow into the cask until all the foul air is driven out at a tap-hole; or the common bellows may do, by forcing the enclosed air to issue by the sides of the pipe. This first-mentioned shape is, however, useful in the cellar for other purposes, which will be afterwards explained. This blowing into the cask is continued until a well-lighted match will burn wholly away by means of the included air, while the bung is

perfectly close. The cask is then washed, first with water, and then with a little wine or brandy, passed over the whole of the inside surface. It is then drained, but used only if it smell sweet. This operation is chiefly used when the cask is immediately wanted. In other cases "it answers equally well, to turn it, with the bung-hole open, over a stream or upon the earth. At the end of ten or twelve hours the sour taste will be gone, and the match will burn freely." The interior of the cask is inspected by means of an instrument called the visitor, by which a lighted taper is introduced so as to enable a person to see the sides by looking in at the bung-hole. If the tartar be clear and unstained, the cask has only to be washed out; but if covered with white moss, it must be unstaved at one of the sides, and swept with a broom. Although the inside of the cask be covered with white moss, it may be sufficiently cleansed by rinsing it with water in which lime has been immediately slaked, and still retains its heat. New casks are washed first with water; a small quantity of very hot and strong salt water is put in, and, the cask being bunged, passed over every part of the inner surface. The cask is then emptied; and, when cool, is again washed with a small pailful of boiling wort, hot wine, or an infusion of peach-leaves. All these operations are equally attended to, with respect to the working-tuns and other vessels.

In storing the wine in the cellars, the casks are placed on wooden frames only six or eight inches from the ground, about three feet apart, and so as to be seen on all sides. This is the modern practice; and it is only in the case of bottling that they are now placed on higher stillions. This nearness to the floor prevents the manner of racking as practised in this country. There is not sufficient height to introduce a pail: to remedy this inconvenience, as well as to prevent all unnecessary agitation of the wine, by which the lees might be raised from the bottom, the following contrivance is now very generally resorted to.

A leather pipe, usually three or four feet long, having a wooden funnel at each end, but of different sizes, is kept in the cellar for that purpose. One of these funnels is pressed into the straight mouth of a brass cock, which is put into the tap-hole of the full cask; and the other funnel is inserted into the bung-hole of the empty cask, which it exactly fits, being tapered so as to suit slightly-differing bungs. A few holes being bored in the upper stave of the empty cask, the brass cock of the full one is opened, and the wine flows from the

latter into the former. This it continues to do until the liquor in both is on the same level, that is, when each is about half full. The mouth of the bellows, formerly described, is then inserted into the bung-hole of the cask that is emptying; and the remaining liquor, as far down as the brass cock, is, by the compression of air, blown into the other cask. The cock is placed as near the bottom as possible, and therefore almost the whole of the wine is forced out. The rest, as long as it runs clear, is got off by tilting the cask; and that having been placed quite horizontal, the lees are left undisturbed in the lowest part of the vessel.

Visiting every cask in the cellar, at least once a day, is indispensable. The best casks may leak. A worm-hole may have been left unobserved, or an unexpected secondary fermentation may occur. It is on this account that so much room is left around the cask; for the assistance that one may require should never be allowed to disturb another. It is, besides, very important that they should always be kept full; for, independently of the loss by leakage, the empty space is quickly filled with foul air; and a white moss, the forerunner of acidity, is speedily formed on the surface of the liquor. When these spots are once formed, the air must be expelled from the vacuity of the cask until a taper can be made to burn for some time above the wine. This is done by means of the common bellows, in the manner formerly specified. The cask is then to be filled with wine of the same age and quality; for mixtures of different kinds always induce a new fermentation. The white spots of moss, here spoken of, are occasionally seen on the surface of all fermented liquors, and particularly in the necks of bottles. The French term them *fleurs de vins*, and in some parts of this country they are called *summer scales*. Chaptal made many experiments to ascertain their nature, and concludes by supposing that they are only a slight alteration of his favourite *vegeto-animal* principle.

While on the subject of casks, we may notice the far-famed tun of Heidelberg, which is shown as one of the curiosities of the place. It is hooped with copper, and contains about 1340 of our barrels,—a very pipkin, compared to the once-used porter-vats of London. “The keeper of this storehouse,” says M. Jullien, “never fails to present the wine to strangers, with much ceremony, in a beautiful cup called *wiederkom*; announcing at the same time, that the liquor is one

hundred and twenty-years old. The fact is, that the quantity drawn off is replaced every year by new wine." Like the greater part of the Rhenish wine, that of Heidelberg is of the dry class.

CHAPTER XII.

OF RACKING AND SULPHURING.

UNLESS the *must* has been of a high gravity, the wine is apt to turn acid in the cask. To prevent this degeneration, is the object of the labour in the cellar. There are certain discordant principles which continue the insensible fermentation; and care must be taken that these do not imbibe oxygen before they have united into a homogeneous and permanent fluid. After this union is perfected, the risk of acetification is small. Red wines are more apt to sour than white of the same strength; and the fermentation along with the marc, which always proceeds with the more violence, is considered as the cause.

The wine continues to work for some days after it is cleansed, and throws out a kind of yeast from the bung-hole. In this state the cask is filled up with wine of the same species, in the same manner as is practised by the brewers of beer. When the fermentation ceases to be sensible, the wine is made; but it acquires new qualities by clarification, which preserves it from running into the acetous stage. This clarification operates spontaneously, and forms, by little and little, a deposit on the bottom and sides of the cask, and thus spoils the liquor of all those matters which it held in suspension. This deposit, called *lees*, is a confused mixture of tartar, fibre, and colouring matter; and, above all, says Chaptal, of that *vegeto-animal* principle which constitutes *ferment*.

But those matters, though precipitated from the wine, are still deposited in the cask, and are apt, from change of temperature, to mix again with the wine, and bring forward a secondary fermentation, which, from the want of sufficient spirituousity, or of *saccharum* (either of which would save it), terminates in acidity. It is to evite this danger that racking becomes necessary.

However pure the wine may appear after the first racking, it always contains a *lee* that is capable of imbibing oxygen; and it is to guard against this absorption, until a new deposit is made, that the wine is impregnated with sulphurous gas, of which the experience of ages has proved the utility. There are several methods of sulphuring wines. The most usual is by means of *brimstone matches*, which are made for the purpose, and form a considerable article of trade. They vary materially in the different workshops. They are, very commonly, narrow strips of linen or cotton, about eight inches long, that are dipped in melted sulphur, in which some introduce aromatics, such as powdered ginger, cloves, thyme-blossoms, &c. The Strasburg matches, which are most esteemed, are covered with the leaves of the sweet-scented violet.

The most general method of proceeding, in the sulphurage of wines, consists in burning three or four matches in the cask, which are lighted and introduced by means of an instrument that also stops the bung-hole. A part, perhaps a third of the wine, is poured into this sulphuretted cask, which is bunged and agitated strongly for nearly two hours, to make the wine imbibe the vapour. The vitiated air that is loose in the cask is then forced out by means of the bellows; and, being replaced with fresh air, three or four more matches are introduced, and burned as before in the closed cask. This operation is repeated so many times, according to the degree of sulphurage which it is wished to give the wine; and, in this way, from thirty-five to seventy matches are consumed for every cask of one hundred gallons.

The sulphurage of casks is done in various ways. Usually a match is suspended to an iron wire, lighted, and inserted into the cask, which is then bunged. The interior air dilates, and issues through the smallest crevices: two, three, or more matches, as is judged necessary, are burnt in the same manner. The inner surface of the cask is slightly acid, and the wine is filled in. Instead of a piece of wire, an instrument is often used having a hook at one end to hold the match, and a bung at the other to close the cask. In other places they pour a portion of the wine into the cask, and burn two or three matches in the vacuity. They bung the cask, and shake it violently in all directions; and then leave it for an hour or two to settle. More wine is added, and the operation repeated until the cask is full. This is the practice at Bourdeaux.

In Languedoc, a sort of wine is made with white raisins, called *muet*, which serves to sulphur other wines. The *must*, or juice, is pressed from the vintage, and before it has time to ferment it is put into casks, each being only about a quarter filled: three or four matches are burnt in the vacant space, the bung being closed. The liquor is then agitated in the cask for the space of two hours. The vitiated air remaining in the cask is then forced out by means of the bellows; and being replaced by fresh air, three or four more matches are burnt, and the agitation renewed. A succession of similar operations are performed in the same manner, until the *must* in each cask is supposed to be sufficiently impregnated with the gas; and, in this way, thirty-five and sometimes seventy matches are consumed for every cask of eighty gallons. This *muet* never ferments; or should it show the slightest sign of doing so, the sulphurage is renewed, and it is therefore that it has its name. It has a sweetish taste, and smells strongly of sulphur. It is mixed with other white wines; two or three bottles to a cask being reckoned equivalent to a sulphurage.

Sulphuretted wine loses its transparency at first, but soon clears. "This," says Chaptal, "shows that *it precipitates the ferment* which still remained dissolved in the liquor." This we do not know; but there is another and more obvious way of accounting for its anti-fermenting effect: it displaces the atmospheric air as well as the carbonic acid, the two great causes of renewed fermentation. The ancients composed a mastic with pitch, wax, salt, and incense, which they burnt in the casks; and wines so prepared were known by the appellation of *vina picata*; and hence, perhaps, the fir-tree was sacred to Bacchus.

The best method of racking wine has been already mentioned: the period at which it should be done depends upon circumstances. Wine should always be racked before sulphuring, and also as soon afterwards as it becomes clear. The intention is, to free it from the lees, to prevent their mixing again with the liquid. On this principle, it should always be racked when it is meant to be removed. Particular months are observed in the different vineyards; generally, those of March and September.

The wines are said to shew marks of incipient fermentation in certain seasons, in particular during the flowering and the ripening of the vines. The time for racking is that of their greatest repose.

CHAPTER XIII.

OF FINING OR CLEARING WINE.

RACKING only separates the wine from such impurities as subside naturally in the form of *lees*. There are other matters suspended in the fluid, which can be caused to deposit by artificial means; which not only hasten the general operation of *clearing*, but probably throw down substances that might otherwise be indefinitely retained. This view of the application of *finings* is more extended than the usual idea of clarification. A liquid may be extremely transparent, and, nevertheless, contain useless, or even noxious ingredients; and finings which would act upon such transparent fluids are not merely clarifiers, but chemical agents of a more powerful kind.

It should be observed, that what we have said of racking and sulphuring is applicable chiefly, if not wholly, to the mellow wines of France. These being attenuated to the weight of water, or nearly so, before they have been many weeks in the cask, contain little saccharum, and their *useful* fermentation is at a close. In sweet wines there is often an opposite object in view. There the attenuation is slow and protracted; and a secondary fermentation is wished for rather than avoided, in order to increase the alcoholic principles, and diminish the over-luscious flavour. We make these observations for the purpose of distinguishing between the several sorts of finings. Some may descend in wine of a certain gravity, when they would ascend in liquor of a less attenuated class.

The clarification of wines depends on the nature of the substances employed for that purpose. The result of the action may be *chemical* in the first instance, and then *mechanical*; or it may operate solely by mechanical means. When the substance introduced into the liquor combines with one or other of its component parts, or when it changes its nature by its contact with them, the action is at first chemical. When the substance that is introduced is insoluble in the liquor, and precipitates merely in consequence of its greater specific gravity, the action is purely mechanical. In the former case, the matters introduced into the wine, and the parts of the liquor which combine with them, first decompose

each other, and then form a recombination which renders them insoluble, and gives them a density superior to the remaining fluid by which they are precipitated. In the latter case, the substances have no affinity to any of the parts of the liquor; but, falling by their natural weight, carry down the lees, tartar, and other uncombined matter which they meet with in their passage.

In the chemical class of finings are reckoned isinglass, the gelatine of bones, white of eggs, gum, sugar-candy, &c.; but these do not all act in the same manner, nor combine with the same principles. The mechanical agents are, powdered flints, sulphate of lime, brown paper, &c.

The use of isinglass in fining beer has been already explained, and its action on wine is of the same nature. It must, however, be dissolved in wine, not in beer. The French chemists say that its union with the feculencies is occasioned by a portion of *tannin* which they contain; and that wine without *tannin* cannot be cleared with isinglass, which, in that case, dissolves in the liquor; and when there is not enough of that substance naturally, or extracted from the casks, it must be artificially introduced, by putting the wine into a new cask, or by throwing in oak-chips. To clear wine with this substance, a resistance must be formed. When the wine is devoid of *tannin*, it is best to clear it with the white of eggs, otherwise the particles that prevent the transparency are not quickly enough carried down.

Bone-isinglass, or jelly made from hartshorn-shavings, is much better than fish-isinglass. It clears a cask as well as white of eggs, and deposits *lees* that are in greater quantity, more compact, and less easily disturbed during the process of racking: it is also very cheap. The white of eggs is preferable for red wines; and it is said that fifteen millions of eggs are used annually in the city of Bourdeaux for that purpose. For white wines, however, common isinglass has the superiority, as producing greater purity.

Sheep's blood is also recommended. "I have," says M. Jullien, "seen it employed with success upon white wines of a yellow stain, and at the expiration of four days it leaves the liquid perfectly white and limpid. Take it warm from the animal; and after mixing it with a bottle of wine drawn from the cask, it is fit for use. The dose is about half a pound to a cask containing one hundred and fifty bottles. The effect of milk is similar to that of blood; and both are used commonly for stained white wines, which it is indispen-

sable to clear before bottling. The usual portion of isinglass is also added."

In clearing red wine, the white of four fresh eggs is the usual allowance to a cask of one hundred and sixty bottles. The white is well whisked up in a bottle of the wine, put in at the bung-hole, and the whole liquor stirred for a few minutes with a cleft stick. Fill up the cask; and beat round the bung-hole, to break the air-bubbles. The bung is then replaced, after being wrapt up in a new piece of cloth; and the wine, left to settle, will be fit for bottling in four or five days, though it may be allowed to lie longer without any injury. When the wine is very high-coloured, six eggs may be used in place of four. If it does not clear the first time, it must be racked and cleared again. A handful of salt is sometimes added to new wines, when they are difficult to clear. The white of eggs in that case may be beat up with water, the salt increasing its gravity. Old wines, being much more attenuated, allow the finings to deposite sooner.

M. Jullien, whom we have so often quoted, has devoted more attention to wines than any other French writer. His "*Manuel du Sommelier*" contains much useful information respecting the management of the wine-cellar, and particularly on the preparation of finings. Those preparations, however, appear to have been gathered from the practice of the vineyards; and are given without any attempt to account why, in certain cases, one is to be preferred to the other. The preparations are different for new white wines; and for old wines, as well red as white. The fact is, that the attenuation is of more effect than all the other principles which the wine is supposed to hold in solution. Red wines are more strongly fermented than white, and, being lighter than water, allow the white of eggs to descend; while the white wines, and especially the new white wines, require to be fined with a heavier substance. Keeping these principles in view, we shall here insert, in an abridged form, an account of a few of M. Jullien's preparations, as they may be useful to the wine-merchants of this country.

1. *Preparation of Isinglass for clearing White Wines.*

Take two drachms of pure white isinglass; beat it with a hammer, to make it unfold easily; tear the leaves into very small pieces; and put them into an earthen dish with as much white wine as will cover them. The wine will be absorbed in a few hours, and an additional quantity must be added: in

about twenty-four hours, the whole will become a jelly. Add then three gills of lukewarm white wine; knead and break the undissolved lumps, and strain the whole through a linen cloth. Whisk this jelly well, and add white wine until you shall have produced about three pints. This will keep good for months, if corked up in a bottle.

2, *Preparation of Bone Isinglass.*

This isinglass is easily and quickly dissolved. It may be put on the fire with water, which dissolves it long before the fluid boils. If it be steeped eight or ten hours in cold water, it will then dissolve at a blood heat. When completely jellied, beat it up in the same manner as is done with the white of eggs. Add water until it be sufficiently fluid, and then put it into the cask.

3. *Method of clearing Sweet Wines.*

Sweet wine being worked thick, preserves for a long time a disagreeable colour and clammy taste. These are remedied by clearing; but liqueurs are more difficult to clear than dry wines.

Place the cask on a stillion, so as it may be easily racked. Bore the end in three different places, and put in three taps. These should be at different heights, so as to divide the liquor in three portions of equal depths; the lowest tap being as low as possible. At the side of each tap put a gimlet-hole, and a peg or spoil. After drawing off a few pints, fine the cask as usual, with a little more than a pint of the prepared isinglass, beat up with an equal quantity of wine, and let it stand without bunging. In a quarter of an hour, pull out the upper *spoil*. If the wine comes out foul, peg it again; and try every five minutes, until it runs clear. All that will run from the upper tap may than be taken off in jugs, with as little shaking as possible; on which account the tap should not be put in and out, but the liquor should be allowed to continue running, until it stops of itself. The jugs must be emptied into a vessel that has been well fumigated with sulphur. In the same manner the second peg is tried; and when it runs clear, the cask is to be emptied down to this middle tap. The lower portion of the wine is drawn off in the same way. The liquid will not be transparent by this operation, but it will be separated from the greater part of its lees. Let it be fined a second time, and it will become quite pure in the course of twenty-four or thirty-six hours. The tap must be opened the

moment the wine runs clear; because, if left longer, the lees will remix with the liquor, and will not settle again until the fermentation is appeased.

Those substances which purify by mere mechanical action are less frequently employed; although we should suppose some of them, on account of their weight, to be peculiarly well adapted for fining sweet wines. Calcined flints, reduced to powder, and sulphate of lime, not calcined, but pulverized, are those that are in most general use. A pint of either of these put into a cask containing fifty or sixty gallons of wine, well whisked up beforehand in a small portion, will often produce transparency. Brown paper acts as a real filter: a sheet is plaited up and introduced at the bung-hole, where it spreads over the surface of the liquor. A second is put in after the first is judged to have unfolded, and the number of sheets is increased at pleasure. These sheets sink slowly, and produce perfect transparency, if spread over *the whole surface*; but this is very difficult to effect, especially in a cask that lies on its side. It is obvious that liquors of a specific gravity superior to that of brown paper could not be fined down in that manner.

Gum-arabic has been recommended; but we know not that it has ever been used. Calcined sulphate of lime (plaster of Paris), calcined oyster-shells, sugar-candy, milk, &c., are usually included under the head of finings; but as these several substances are used with other views than that of mere purification, they belong properly to another chapter of our work.

CHAPTER XIV.

OF THE ACID DEGENERATION OF WINE.

WHEN speaking of certain wines, we said that they seemed to be possessed of the principles of immortality. This, however, must be restricted to our ideas of comparison, and apply only to the kinds of which we then spoke. The truth is, all wines, how well soever they may be fabricated, and under whatever advantageous circumstances, change their character with age. When the connoisseur is pleased with such change, he says that the liquors have improved; otherwise, that they

have degenerated. Soft and mellow wines are much more short lived than the other kinds. Their aroma vanishes during the period that the perfume of the sweet wines is increasing, or, perhaps, only beginning to be felt. Every vineyard has a fixed and known duration; and this duration varies even in wine of the same vineyard, according to the seasons. When these are damp or cold, the half-ripened raisin is watery or acid, and the wines of those years are of lessened durability.

The ancients determined the age at which each kind of wine was ready for consumption. The famous *Falernian* was fitted for the table at the age of ten years, and continued to be so until it reached its twentieth year. That of *Surentum* was never used until it was twenty-five years old.

Acidity is the natural death of vinous liquors; and to prevent this state, all the care of the wine-maker (as well as of the brewer and the distiller) is chiefly directed. We say to *prevent*; for when the disease has taken root, it is incurable, by any medicine that has hitherto been discovered. The repeated racking and sulphuring, which the greater part undergoes, have all this end in view; and without these operations there are few indeed that could be safely removed from the vaults in which they are first deposited. It is also for this purpose of preservation that so many of the export wines are so loaded with alcohol. The taste of the countries to which they are sent, has been the consequence, and not the cause of this practice.

According to Chaptal's theory, the saccharine substance and the *vegeto-animal* (or leaven) exist in the *must* in proportions that differ with the quality of the grapes. When the sugary body is very abundant, the vegeto-animal principle is all employed in decomposing the sugar; and not sufficing for that purpose, the liquor remains sweet, without risk of acidity. On the contrary, when the vegeto-animal principle is more abundant than the saccharine, the latter is decomposed before the former has been all absorbed: in this case there remains a ferment in the wine, which, acting upon the other principles, combines with the oxygen of the atmosphere, and produces the acid degeneration. "We can prevent this bad effect," he adds, "only by clarifying, fining, sulphuring, and decanting the wine, to deprive it of the remaining ferment; or else by mixing sugar, or very sweet *must*, with the wine, for the purpose of continuing the spirituous fermentation, and employing all the leaven in producing alcohol.

Wines never turn sour, as long as the spirituous fermentation is not terminated; or, in other words, as long as the sugary principle is not completely decomposed."

We have before expressed our doubts of the accuracy of this theory; but if the assertions which we have quoted be founded in fact, the acetous fermentation could never take place as long as there remained an atom of saccharine matter in the fluid. This is a comfortable doctrine; and we should be glad to be convinced of its truth. If so, we need never fear acidity; for sugar is always at our command. On this principle, there ought never to be a drop of sour wine in France. The sugar and the ferment might always be so combined as to neutralize one another; and all the labour of fining, sulphuring, &c., might be saved. Practice, nevertheless, generally sets at nought all theories; for, at best, we see only a glimpse of the arcana of nature. We suspect that there are principles in the juice of certain vines, in certain seasons, which could never be completely neutralized by any admixture of the sugar of the cane. But, however all these things may be, the experience of facts is unchanged, and, after all, must be our best guide. The French still continue the manipulations which we have described, for the purpose of preventing acidity; and still strive in vain to cure it, after it has taken effect.

It is doubtless that acidity will not take place unless the wine be in contact with atmospheric air or oxygen. In countries where wine is dear, every attempt is made to restore it when it contracts acidity; and this leads to the promulgation of various receipts and nostrums which are useless in other nations. It is there observed, that the acescence begins at the upper surface of the liquor, at the bung; from whence the stratum descends, in consequence of the additional gravity caused by the absorption of air. When this is perceived, the cask is racked, which subtracts the greater part from that which has begun to change. Boiled *must*, honey, or liquorice-juice, may be then introduced, to provoke a new fermentation.

M. Bidet asserts that a fiftieth part of cream added to sour wine will recover it, and that it may be racked in five days after. "This," says Chaptal, "merely clarifies the wine, and deprives it of the vegeto-animal principle which occasions the acid degeneration." We should like to see the experiment made. Butter is oxydized cream, as may be seen in attending to the process of its formation. May it not be formed, and deposited, by deoxydizing the vinegar?

"Take," says M. Jullien, "forty nuts for a cask of two

hundred and fifty bottles; divide each kernel into four parts; roast them like coffee, and throw them burning-hot into the cask. Clear with white of eggs. In four days, the wine will be limpid, and re-established: rack it, and bottle it; but be careful in tilting the cask, because the acid particles lie at the bottom, in the dregs, with the nuts. Four ounces of roasted wheat have the same effect; but you must rack in twenty-four hours, to prevent a bad taste." Others take four ounces of wheat, and boil it in water until it bursts; put it into a bag when cold; and plunge it into the liquor, keeping it down with a rod.

It is a common practice to neutralize the acid by means of potash, soda, or lime, either of which forms a salt by no means agreeable. The bad savour, as well as the loss of strength occasioned by the acetification, is partly covered by an infusion of sugar-candy previously dissolved in a portion of the wine "You rogue!" said Falstaff, "here's *lime* in this sack too. There is nothing but roguery to be found in villainous man!"

At one time (but we hope the poisonous ingredient is not now used) it was customary to cover the acid taste by means of sugar of lead; and other oxyds, still more deleterious, have been laid to the charge of wine-merchants. The solution of lead is precipitated in a blackish sediment, by letting fall a few drops of melted sulphur into a glass of the wine that contains it. This sediment is a sulphuret of lead: but the same test would deposit iron, which, though harmless, might be mistaken for lead, and cause injurious suspicions. Wines that are merely high coloured often give a dark precipitate with this test. We have not heard that iron, under any of its forms, is ever intentionally introduced; but that metal is so generally diffused in water, and even in vegetables, that it is by no means surprising that it should be frequently found in wine. The following discriminative *wine-test*, for the detection of deleterious metals, is well known on the continent.

Take equal parts of oyster-shells and common brimstone, reduced into a fine powder, and mix them in a crucible. Put this mixture in a strong blast-furnace, so as to raise it as quickly as possible to a *white heat*, in which state it must remain a quarter of an hour. When the mass is cool, reduce it to powder, and afterwards put one hundred and twenty grains of this powder, and one hundred and eighty grains of cream of tartar, into a strong bottle of common water: boil

the whole for an hour, and then allow it to cool. Cork the bottle, and shake it from time to time. After a few hours, pour the clear portion of the liquor into ounce phials, adding, to each, twenty drops of spirit of salt (muriatic acid): cork the phials well, and seal them up for use. A part of this liquid, mixed with an equal quantity of wine, will discover (by precipitating it in a black powder) the least quantity of lead or copper. If the wine contain arsenic, it will also be precipitated; but the colour will be *orange*, while the iron, if there be any, will be retained by the muriatic acid. When the precipitate is cold, we may discover the iron, by saturating the remaining portion of the wine with a little carbonate of potash, which will cause the liquor to become instantly black.

This test is easy of application, and ought to be in the possession of every gentleman who can afford to drink French wines. The method of manufacture is also easy, and, we dare say, is already known to the practical chemist; for it is described, very nearly as we have done, in the *Chemical Catechism*, one of the most deservedly popular books on this science. The author, here alluded to, neglected to state its application to the detection of arsenic, probably from his having had no suspicion of that metal's being introduced into wine; but, we believe, it was principally to detect this deleterious ingredient that the test we speak of was first promulgated.

In a small tract printed at Florence in 1786*, there are many pertinent remarks on the various adulterations of wine, with specific tests for the discovery of each noxious ingredient. The author dwells particularly on the metallic oxides; which were, he says, at that time made use of, for the purpose of preventing, or of neutralizing, acidity. Besides lead, which has been frequently detected, he mentions copper, arsenic, and corrosive sublimate. "The sophistication of wine," adds our author, "by two terrible poisons, viz. corrosive sublimate and arsenic, is practised by the Dutch (who export the wines of France into distant countries), for the purpose of preserving them in a sound state. They fumigate the interior of the casks with arsenic, sulphur, and rosin†. The dangerous effects that may follow are obvious."

* "Metodo di conoscere alcune delle più dannose Adulterazioni che si fanno ai Vini, &c." Svo. 36 pp.

† The use of rosin as an anti-acid is not a modern discovery. The *vinæ picatæ* of the Ancients (mentioned by Pintarch and Hippocrates) were so called because they were preserved in casks that had been previously fumigated by the smoke of burning *pitch*.

Chemical knowledge has of late been much more generally diffused than it was at the time from which we quote. Almost every village apothecary, both in this country and on the continent, is now capable of detecting metallic solutions; and, on this account, more than from our confidence in the moral improvement of foreign wine-merchants, we were willing to believe that the infusion of those deadly ingredients was no longer practised. A recent circumstance, however, has awakened our suspicions. The following abridged account is extracted from a paper by Professor Christison, inserted in No. 102 of the Edinburgh Medical and Surgical Journal.

Poisoning with Arsenic.

"On the 1st of November, 1829, the family of a baronet in Roxburghshire, together with several visitors, amounting altogether to six persons, all adults, were taken severely ill during dinner, or soon after it. Most of them rose from the table before the cloth was removed; but two of them were not seized till about an hour after the rest. The symptoms were, in all, sickness, vomiting, and severe pain of the bowels; and, in no long time, one of them had also diarrhœa. The vomiting continued violent till early next morning; and warm water was taken freely, to encourage it. In the course of the night, all were affected with a sense of heat in the stomach, throat, and mouth; and in the morning, the lips became encrusted, and the skin cracked and peeled off. For three or four days the whole party had a disinclination to eat.

"The simultaneous occurrence of such symptoms, during a meal, in so many persons, left hardly a doubt that some poisonous substance had been mixed with one or other of the articles used at dinner. In order to discover what the poison was, and in what vehicle it had been taken, various articles were sent to me for analysis, through Mr. Stuart, of Kelso, one of the surgeons who attended the family."

After describing the delicate manipulations by which he was enabled to discover the 250th part of a grain of arsenic in a portion of the vomited matter, the Professor thus proceeds:—

"Fortunately, all reason for hesitation was removed by the subsequent proceedings. It was afterwards remembered by the party, that they had all partaken of certain bottles of wine, the remains of three of which were therefore sent to me. In a bottle of Teneriffe, and in another of a light French white wine, sulphuretted hydrogen gas caused no change

whatever ; and both of them were free of foreign taste. But in the remains of a bottle of champagne, which also was free of any taste except that of vinous sweetness, the same test caused a copious sulphur yellow precipitate. The arsenical nature of this precipitate was proved by the process of reduction. Two ounces of the wine gave one grain and a quarter of sulphuret of arsenic, corresponding to one grain of oxide of arsenic."

On subsequent inquiry, it appeared that the bottle of champagne was brought from the cellar, before dinner, by the baronet himself ; who undid the wire during dinner, immediately before the wine was used. This circumstance at once shewed that the wine had been poisoned before the bottle was corked by the wine-merchant.

Each of the six individuals took a single glass of it, or about two ounces ; and, consequently, each took a grain of arsenic. It has been generally said, in systematic works, that a grain may prove dangerous ; but I am not aware that any direct and positive fact has hitherto been published in support of this statement. The severe effects experienced by all the individuals in the present instance, notwithstanding that the poison was not taken till the stomach contained a considerable quantity of food, proves that, on an empty stomach, a single grain of arsenic might cause very alarming symptoms, if not even death itself. Four of the party were taken ill about ten minutes after drinking the wine ; which is a sufficient answer to those who imagine that arsenic never begins to act in less than half an hour. None of the party perceived any unusual taste in the wine. This is a new and quite impartial testimony on the important question of the taste of arsenic, concerning which so many vague and erroneous statements have been published by authors, and sworn by witnesses. In conjunction with other late instances of the same purport, it establishes the fact, that arsenic may very readily be swallowed in considerable quantity without its presence being suspected.

Notwithstanding the minuteness of Professor Christison's investigations, a material circumstance appears to have been overlooked. It is probable that Sir John Douglas (the baronet alluded to) had other bottles of champagne in his cellar, furnished by the same wine-merchant ; and it would have been more satisfactory had some of those been also examined. We could account for the introduction of arsenic into an occasional bottle, without the intention or even the

knowledge of any person whatever; but we cannot account for the poisoning a whole bin, without strong suspicion of design. In explaining our ideas on this subject, it will be seen that we do not deviate from the objects of the present Treatise. To the inhabitants of this country, it is of much less importance to know how any particular species of foreign wine is manufactured, than to learn how to guard themselves from the effects of its adulteration. The following observations may perhaps account for an occasional accident; and, at the same time, may serve as a caution to the bottlers of wine in this country.

We have already mentioned, that the bottled wines of the continent (particularly champagne) undergo at least one or two *decantings* or *rackings* in the bottles, before they are exported. A *bin* of wine is tried, to see whether or not it is fit for the foreign market. The practice is (especially in the wine of which we speak) to use very fine, that is, *elastic* corks; to push them half into the bottle; and to press the upper part over the neck, in a sort of girth or rim, which is kept down by means of twisted wire. This cover of the top of the bottle is re-covered with wax of a certain colour; and what that colour is, depends on the substances with which the wax is mixed. If it be yellow, the colouring matter is orpiment; and if it be green, the colour is usually given by the admixture of orpiment and Prussian-blue. Both these colouring matters are poisonous; for orpiment is sulphuret of arsenic; and Prussian-blue is formed with one of our most instantaneous poisons—the *prussic* or (as it is now termed) *hydro-cyanic acid*.

Let us suppose, then, that a bin of champagne is intended to be exported, or, if in a British cellar, to be sent to a customer. A bottle is drawn for trial, and it is found to be deficient in effervescence. This can be remedied, by inducing a new fermentation; and we know that it is the practice to accelerate this desirable quality by means of the introduction of a syrup of sugar-candy, mixed and purified with cream of tartar. This addition, which is put into the bottle in proportion to the taste of the customers, is certainly not deleterious. But, the cork is drawn, the seal is broken, and a part, perhaps a few chips, of the wax is rubbed off, and enters into the bottle. If the colour has been either green or yellow, arsenic also enters; and, unfortunately, the world is but too well acquainted with the consequences. We may also add, that, in French cellars, the wax has another object in view

besides (what is generally thought) the exclusion of atmospheric air. In that country there are numerous swarms of insects, who are ready to devour the corks and penetrate to the liquid. As far as regards those insects, the poisonous quality of the colouring matter is not regretted.

CHAPTER XV.

OF OTHER DISEASES OF WINE.

1.—*Of the Grease.*

WEAK white wines, that have been fermented without the *grappe*, often lose their fluidity, and take a tenacious consistence, similar to oil. This disease is termed the *grease* or *ropiness*, and sometimes attacks ale that has not been sufficiently attenuated. Wine will turn *ropy* in bottles, however well corked; but seldom in the casks. This disease is more frequent when the season has been rainy and the vintages humid: the *must* is then more watery, and contains a less proportion of tartar. Chaptal ascribes it to the circumstance of the gluten, or *vegeto-animal* principle, being in excess relatively to the sugar. A greater or less quantity, he says, of this matter, half decomposed, and imperfectly dissolved in the wine, forms the grease. This half-decomposed matter appears to us to be merely half-formed saccharum, which would have become sugar had it been oxydized in any way before the fermentation had stopped. Accordingly, this wine (which in Champaign and Burgundy, in some years, includes almost the whole harvest) seldom fails to cure itself spontaneously with time. It renews its fermentation; and this fermentation is easily accelerated by the introduction of common sugar, or of an acid, of whatever kind. Hence the numerous cures. Carbonic acid extracted from limestone, sulphurous acid from burning brimstone, tartaric acid, and even sulphuric acid, are all contained in the list of cures. They are all agents of saccharification, oxygenating the mucilaginous or starchy part of the wine, and thereby inducing it to ferment anew. The processes are various.

The bottles are emptied into a cask, and the fermentation is then renewed by the following means:—

For a barrel containing sixty-six gallons (three *hectolitres*) take a gallon of good wine, and put it in a vessel on the fire until it be boiling hot: dissolve in this wine eight to ten ounces of pulverised cream of tartar, and an equal weight of sugar: when these two substances are sufficiently dissolved, pour the whole into the cask which contains the *greasy* wine. The cask is then bunged; and a large gimlet-hole is made in the bung-staff, which is shut with a pin. The cask is then rolled, and agitated, during five or six minutes. If, during this operation, you fear any explosion from the confined gas, it should be allowed to escape at the vent-hole, which must be again shut.

After standing two days, the liquor is to be fined in the ordinary way, without agitating it at the bung-hole, as is sometimes done. The bung is again firmly closed; and after four or five days' repose, the wine will be clear, and the ropiness gone. It is then to be carefully racked from the lees.

An increase of heat to about 100° will often renew the fermentation, without any extraneous ingredient; and thus convert the mucilaginous parts into wine. This, we are told, is hastened by the admixture of a portion of sulphuric acid, "which not only arrests the progress of the disease, but destroys it, and re-establishes the fermentation. It is afterwards necessary to neutralize, by means of lime, the sulphuric acid that remains in the liquid."—This is obviously the same process which is practised by many of the French distillers, in the saccharification of the fecula of grain or of potatoes; and shews the analogy between the undecomposed *vegeto-animal* substance of the chemists and the common farina of the cereal grains.

"It has been observed," says Chaptal, "that the wine of very ripe and consequently very sweet raisins is not always exempted from this disease. This may be the case; but it is owing to the haste with which it is put into bottles. The fermentation is thereby suspended, and the *two principles*, already altered in their nature, are become less soluble, and disengage themselves from the liquid. Sugar, gum, and oil, differ only in slight proportions, in the more or the less of oxygen, of carbon, or of hydrogen; and the transformation of these bodies from one to another is produced every day, in the operations of nature."

2.—Of Discoloration.

All wines change their colour with age. Red wines become lighter and lighter, and the white acquire a yellow

tinge. But, independently of age, the colours often change from accidental or unknown causes. The red is stained with black, and the white becomes livid and yellow.

Red wines, when the colour disappears with age, are recovered by mixing them with such as are younger and more highly coloured; and the same remedy of mixing is applied when wine becomes *pricked* or *hard*, by long keeping. If this incipient acidity be the consequence of a continuing acetification, mixing will be of no service; and if it can be mended at all, it must be by one or other of the means formerly described.

Great heat and extreme cold equally produce discoloration;—frost, by precipitating the colouring matter, in compressing the particles of the wine, and thus diminishing its dissolving power; and heat, by exciting a fermentation, which, decomposing a part of the tartar, leaves the potash at liberty to act upon the extractive and the colour. If we add to this wine half an ounce of tartaric acid for every twenty gallons, the acid will instantly unite with the potash, which will disengage itself from the carbonic acid, and the wine will recover its colour and natural flavour.

When white wine becomes yellow with age, the colour is uniform, and therefore not disagreeable; but when new wine becomes yellow while it is still upon the lees, it may be recovered by turning the cask with the bung downwards, and thus causing the lees to traverse the liquor and deposit upon the bung. After some days, the bung is turned upwards, and the lees deposit a second time. When clear, rack it into a fumigated white-wine cask. Wine that is slightly stained, but otherwise good, needs only be fined down with equal quantities of isinglass and milk, well beaten up with wine. A pint of each, mixed in two pints of wine, will be sufficient for thirty gallons. The same method is used when the wine is highly stained; but before clearing, they must be racked into fumigated casks.

M. Maupin gives the following recipe for improving the bad colour of Spanish wines: Take two pounds of pure starch and a gallon of water. Boil them together for an hour; and when cold, add to it a handful of salt. Mix the whole well, and put it into the cask, stirring the liquor, and then bunging up close.

When wine is frozen in the cask, the colour is spoiled; and its other properties are deteriorated only when it is allowed to thaw. The watery portion only is frozen; but it never

afterwards unites completely with the other parts of the liquor, and hence the stained colour and the disagreeable flavour. The best way is, to draw off the remaining liquid from the part that is congealed. Though lessened in quantity, it will be found to be much more spirituous, and to have all its other qualities unimpaired. There are wine-merchants who freeze their weak wines on purpose to increase their strength.

3.—Of Bitterness.

When wines are old, they often contract a degree of bitterness: the cause of which is ascribed to the insensible fermentation which always acts, whether in the bottle or in the cask. "When," says Chaptal, "the wines are despoiled, by little and little, of the *vegeto-animal* principle, or *leaven*, which is deposited under the form of *lees*, then the *acerb principle* inherent in the wine of Burgundy, and which was masked by the *sweet principle*, appears alone, and with all its characters." Such is the theory, but we do not find that it has made us wiser.

Although the wine acquires a bitter taste, it often remains pure, and, in many cases, recovers without any manipulation. But when the French speak of their recovering *in time*, it is often a space of time which would be reckoned an age in this country, where the merchants look chiefly to a rapid return. Two, and three years, are waited for; and even then the liquor loses much of its *bouquet* and spirit. In order to hasten the cure, some pass the wine over fresh lees, or rack it into a fumigated cask which has been nearly emptied. This racking and subsequent fining is reiterated, should the liquor shew any signs of improvement: but, after all that can be done, the only hope is, to pass it off by mixture, in small quantities, with inferior wine.

CHAPTER XVI.

OF THE IMPORTATION OF FOREIGN WINES INTO THIS COUNTRY.

THE quantity of wine imported from foreign countries can only be known from the books of Customs and Excise. These, for the last forty years, have ascertained the amount with sufficient accuracy; but, previous to that period, the

duties on wine (and particularly French) were evaded in a great degree. The following Tables, down to 1822, are copied, in a condensed form, from Dr. Henderson's "History of Ancient and Modern Wines." That gentleman (we believe) had his figures from authentic documents, which we have not had the opportunity of consulting. We may add, that, not including the whole of the United Kingdom, they are so far incomplete; but they present the comparison of years, and comprehend nine-tenths, at least, of the importations. The continuation, to 1832, was collected from the more recent Work of Mr. Redding, turning the Imperial Gallons into Tuns of the Old Measure, for the sake of uniformity.

TABLE I.

An Account of the Quantity of Wine imported into England from Christmas 1696, to Christmas 1785, distinguishing the quantity and species of Wine imported in each Year.

YEARS.	PORTUGAL.	SPANISH.	FRENCH.	RHENISH.	TOTAL.
	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>
1697	4,774	7,897	3	413	13,087
1698	4,057	7,852	272	793	12,974
1699	8,703	11,702	248	900	21,553
1700	7,757	13,649	665	1,431	23,502
1701	7,409	11,185	2,052	798	21,444
1702	5,925	7,483	1,624	694	15,726
1703	8,845	1,359	140	748	11,092
1704	9,925	3,020	199	668	13,812
1705	8,450	3,011	168	441	12,070
1706	7,709	2,774	159	331	10,973
1707	9,012	3,278	104	569	12,963
1708	9,638	3,990	167	585	14,380
1709	7,651	4,904	238	544	13,339
1710	6,730	8,591	114	434	15,869
1711	7,648	6,787	532	515	15,482
1712	6,483	5,690	116	388	12,677
1713	5,976	7,032	2,552	378	15,938
1714	8,965	8,480	1,198	104	18,747
1715	10,722	9,266	1,261	503	21,752
1716	9,106	7,682	1,570	476	18,834
1717	10,340	9,106	1,396	419	27,261
1718	14,618	6,964	1,798	495	23,875
1719	12,171	6,155	1,767	418	20,511

YEARS.	PORTUGAL.	SPANISH.	FRENCH.	RHENISH.	TOTAL.
	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>
1720	11,152	6,093	1,366	529	19,140
1721	14,087	9,484	1,247	445	25,263
1722	11,580	12,063	1,425	406	25,474
1723	12,337	8,550	1,037	491	22,415
1724	14,223	7,373	1,148	332	23,076
1725	14,404	8,762	1,088	269	24,523
1726	7,773	10,530	634	397	19,334
1727	12,946	6,524	1,086	509	21,065
1728	18,208	10,256	1,105	477	30,046
1729	14,371	9,701	894	616	25,672
1730	18,280	10,428	636	481	19,825
1731	13,122	9,696	1,007	414	24,239
1732	10,940	9,166	866	412	21,384
1733	11,162	9,093	840	326	21,421
1734	11,723	8,393	780	368	21,264
1735	13,838	9,598	668	312	24,416
1736	11,368	8,668	529	199	20,764
1737	14,985	10,674	634	313	26,606
1738	11,488	9,936	472	277	22,173
1739	11,747	6,028	607	212	18,594
1740	7,525	6,596	857	221	15,199
1741	16,559	249	165	205	17,178
1742	15,270	760	436	250	16,716
1743	16,612	528	310	205	17,655
1744	8,029	1,472	557	219	10,277
1745	15,270	461	141	163	16,975
1746	11,451	505	87	163	12,206
1747	13,491	683	206	181	14,561
1748	11,820	2,707	415	193	15,135
1749	13,471	7,345	465	275	21,556
1750	9,050	5,714	418	273	15,455
1751	10,188	3,878	461	260	14,787
1752	10,133	2,919	408	249	13,709
1753	12,815	5,176	624	243	18,858
1754	10,036	4,168	559	219	14,982
1755	11,023	4,658	650	214	16,545
1756	7,841	3,670	555	199	12,265
1757	11,067	2,462	351	172	14,052
1758	10,826	4,613	274	183	15,896
1759	11,670	3,234	338	163	15,405
1760	10,987	3,843	378	220	15,428
1761	9,622	4,245	547	189	14,603
1762	12,996	2,611	304	186	16,097
1763	12,937	3,505	442	199	17,983
1764	13,047	3,721	446	176	17,390

YEAR.	PORTUGAL.	SPANISH.	FRENCH.	RHENISH.	TOTAL.
	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>
1765	13,506	3,854	541	231	18,132
1766	13,136	4,633	498	205	18,472
1767	12,619	3,698	545	225	17,087
1768	14,312	3,650	442	177	18,581
1769	13,760	3,971	461	180	18,372
1770	11,920	4,195	469	141	16,725
1771	12,397	3,777	536	165	16,875
1772	11,958	3,013	476	151	15,598
1773	11,847	3,965	494	125	16,431
1774	13,774	3,532	560	125	17,991
1775	12,659	4,419	497	160	17,735
1776	12,755	3,417	435	127	16,734
1777	14,481	2,982	602	151	18,217
1778	11,871	3,765	596	111	16,343
1779	10,128	2,181	363	89	12,761
1780	17,107	2,903	376	128	20,514
1781	10,963	1,875	379	94	13,311
1782	8,063	1,052	457	219	9,791
1783	10,908	2,149	370	197	13,624
1784	11,435	2,554	386	125	14,500
1785	11,750	2,534	392	131	14,807

TABLE II.

An Account of the Importation of Wines of all Descriptions into Great Britain, distinguishing the Countries from which they came, from the Year 1785 to 1832 inclusive, distinguishing each Year.

Years.	France.	Spain.	The Canaries.	Portugal	Madeira.	The Rhine.	C. Good Hope.	All other Sorts.	Total.
	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>
1785	470	2,770	66	12,171	614	134	—	63	16,288
1786	476	3,140	69	11,770	527	188	—	73	16,243
1787	2,128	4,216	84	16,087	578	177	—	54	23,324
1788	1,445	4,702	118	18,040	1,075	149	—	43	25,562
1789	1,115	3,999	28	19,839	1,174	117	—	27	26,299
1790	1,102	4,869	139	21,432	1,465	122	—	16	29,145
1791	1,137	6,520	77	23,606	1,624	123	—	23	33,115
1792	1,617	5,395	158	26,939	1,252	139	—	25	35,525
1793	1,590	4,364	57	15,630	1,008	111	—	30	22,790
1794	758	6,160	186	22,230	784	129	—	12	30,259
1795	1,348	8,089	136	25,287	700	36	—	14	35,610
1796	1,810	6,093	122	15,018	501	54	—	95	23,693
1797	850	2,259	1	12,421	288	48	—	37	15,904

Years.	France.	Spain.	The Canaries.	Portugal	Madeira.	The Rhine.	C. Good Hope.	All other Sorts.	Total.
	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>	<i>Tuns.</i>
1798	1,577	3,571	434	16,957	659	62	—	27	23,287
1799	1,662	6,677	—	24,300	671	93	—	16	33,419
1800	2,078	8,355	55	20,738	968	120	—	19	32,333
1801	2,507	6,336	37	28,669	1,177	106	46	61	38,939
1802	1,236	5,325	138	22,023	1,498	115	16	72	30,423
1803	1,445	6,872	114	27,683	1,564	58	13	178	37,887
1804	1,426	6,647	199	9,850	1,075	35	9	188	19,429
1805	2,593	9,394	229	20,003	1,102	121	1	21	33,464
1806	5,393	8,265	538	19,848	1,606	103	9	156	35,918
1807	5,438	7,641	608	23,914	1,982	44	21	162	39,810
1808	7,838	11,987	1,683	22,093	2,790	7	178	746	47,322
1809	13,105	10,938	1,659	20,578	2,902	44	16	535	49,778
1810	4,117	10,168	1,564	25,360	2,353	133	20	1,363	47,078
1811	3,441	4,542	1,140	9,261	1,518	10	9	875	20,796
1812	5,100	8,069	2,267	15,008	2,036	23	41	2,539	35,083
1813	*	*	*	*	*	*	*	*	*
1814	3,903	5,635	2,039	15,498	2,019	127	350	1,894	31,465
1815	2,116	5,148	2,328	16,913	1,826	141	1,512	889	30,875
1816	1,612	3,393	835	8,215	1,512	122	1,632	898	18,219
1817	803	4,797	1,133	14,125	1,271	85	4,218	642	27,074
1818	1,799	6,935	1,762	17,945	2,317	154	3,648	1,204	35,764
1819	1,543	4,364	1,578	10,311	2,922	120	1,649	920	23,407
1820	1,097	4,303	1,071	10,598	2,617	130	1,925	1,045	22,780
1821	1,057	4,287	893	12,093	2,412	110	2,114	1,160	24,126
1822	1,193	5,475	810	14,815	2,046	116	2,244	755	27,454
1823	1,464	7,344	806	13,222	2,145	125	4,016	839	29,961
1824	1,189	9,313	1,179	11,396	2,338	132	2,815	1,263	29,625
1825	4,661	12,056	1,211	21,852	2,579	697	3,558	1,578	48,192
1826	2,038	9,474	1,303	13,736	2,713	410	1,696	1,281	32,651
1827	1,686	10,683	1,990	14,592	1,467	380	3,236	1,066	35,100
1828	2,150	8,517	514	14,331	1,223	401	3,333	832	31,311
1829	2,260	7,947	385	11,508	1,040	341	3,114	984	27,579
1830	1,944	8,583	399	12,424	976	315	2,765	1,138	28,544
1831	1,606	10,255	504	13,971	1,087	340	2,559	1,250	31,572
1832	1,328	10,297	463	13,160	1,044	288	2,574	1,252	30,406

* The Records of the year 1813 were destroyed by fire.

THE ART OF WINE-MAKING.

PART II.

OF WINE-MAKING IN COLD COUNTRIES.

CHAPTER I.

INTRODUCTORY.

IN our description of the several processes of wine-making we have, hitherto, confined ourselves to those of the South of Europe; countries in which the grape arrives at maturity, and forms the only liquid that has properly, in our language, a right to the generic name of *wine*. The *vinum* of the *Latins*, however, was applicable to other juices as well as that of the grape: and whatever limit may have been given to the Greek *οινος*, we know that the fruit of the vine was not the only berry that was sacred to Bacchus. It will not then be deemed an incongruous arrangement, if we include, under the genus WINE, all the species of fermented liquors; with the exception of *cider* and *perry* (of which we mean to treat separately); and of those malt extracts that are contaminated with hops, and of which we have already treated at large. The specific names of these several sorts of vinous liquors will be taken, as is usually done, from that of the vegetable juice of which each is chiefly compounded: we shall thus have CURRANT-WINE, GOOSEBERRY-WINE, ELDER-BERRY-WINE, &c., denominated from the several fruits; as well as MEAD (or *wine from honey*), and a few others which have more ancient names.

Of all the vinous liquors which are manufactured in this country, beer and ale, cider and perry, (and mead and mum, when not banished by excise regulations,) are the only kinds that can be called national. The juice of most of our

native fruits possess too little *saccharum* to be fermented pure; and when malt, wort, or honey, was formerly added, as sugar has been in later times, the compound was also flavoured and coloured with extraneous substances, so as to imitate one or other of the favourite wines of the continent. This was more particularly attended to when the making of “*sweets*,” or “*British wines*,” became a trade. The “imitations” of foreign wines originated in fraud; and excise duties raised the “imitators” to the rank of “authorised manufacturers.” As long as those gentlemen were contented with the ordinary names of *currant-wine*, *gooseberry-wine*, &c., all was well; but we now see *champagne*, *sherry*, *port*, &c. in the bills of the British wine-makers; and we have little doubt that some of these compounds occasionally find their way into the cellars of the “Dealers in Foreign Wine.” Champagne, in particular, is a very high-priced article, and the “British champagne,” made from gooseberries, if properly made, and drunk when young, may impose upon three-fourths of the purchasers. Perry, also, particularly in mixture, is passed off for champagne, and is, perhaps, not much inferior to the real wine which it imitates. It is not so much the inferiority, as the *lie*, which passes a cheaply-made article for one that is more expensive, that constitutes the quackery, and the crime of those ingenious imitations. If we can make a British wine equal to champagne, we have a right to do so; but we have no right to pass it off, *in trade*, as a foreign wine.

When treating of the wines of other nations, we separated them into three grand divisions—*sweet*, *dry*, and *mellow*; the last of which included those which, when bottled, became *brisk* and *sparkling*. We shall follow the same divisions, in their imitations. There are, further, general qualities, which attach more or less to each kind: these are, *strength*, *flavour*, and *perfume*. It will save much useless repetition to say something of the qualities in this introductory chapter.

1.—Of *Strength*.

The strength of a vinous liquor is rudely measured by the degree of exhilaration which a determinate quantity produces in the mind of the ordinary drinker. This exhilaration is not, as might be expected, in proportion to the quantity of alcohol which can be drawn from it by distillation; but varies with the quality of the liquor, and, in the same wine, is greater or less, according as the fluid is lively or dull. All

other things alike, new wine is understood to be more intoxicating than old; which is accounted for on the principle, that the abundance of carbonic acid, which it contains, is disengaged by the heat of the stomach, and acts by destroying the irritability of that organ; thereby inducing stupor, in conjunction with the intoxicating influence of the alcohol. Such is the presently-received theory; but we have no accurate means of illustrating it by experiments. The effects differ with the drinker, and with the same person at different times.

The want of strength, that is, of exhilarating power, is reckoned the chief defect of the "imitative wines" of the North. These are cold upon the stomach, instead of producing that warm glow which is felt on drinking a glass of *generous* wine. The inhabitants of a chilling clime are accustomed to require this excitement; and, in order to procure it, they are willing to forego that fineness of flavour and delicacy of perfume which is so highly prized in more-favoured regions. We have already mentioned the means by which the foreign wines acquire that strength which fits them for the English market—by the attenuation of a highly saccharine *must*, and the direct addition of brandy. The juices of the fruits which we employ for factitious wines are weak; and before they can be made to weigh sufficiently by the saccharometer, they must be mixed up with other *sweets*, such as malt-wort, honey, or sugar. These we have at our disposal; but the saccharum thereby created always differs in flavour from that which is contained in the juice of the vine. Neither is the flavour of the added spirits the same, unless we are willing to pay the high price for brandy.

2.—Of Flavour.

The flavour of every species of wine depends almost entirely on the kind and proportion of acid which the berry contains. The vegetable acids which have been analyzed by the chemists are all compounded of carbon, oxygen, and hydrogen, in proportions, in some cases, nearly alike, although perfectly distinct in character. That of the grape is the *tartaric acid*, with (as is supposed) an occasional mixture of the *malic*. The *citric acid* exists in the lemon and some other fruits; and the *malic* gives its peculiarly rough flavour to the apple, the plum, the sloe, and the barberry. In endeavouring to imitate the wine of the grape, we must endeavour to change or deposit the natural acid of the fruit with which

we work ; and if we do this, the *tartaric*, or *cream of tartar*, may be easily substituted in its room. It is the malic acid, particularly, that is the least tolerable. The citric is often chosen as an ingredient in British wines. If we work with a saccharine fluid which has no natural acidity, either the juice of lemon or the tartaric acid may be used, as our taste shall dictate. Crude tartar (supertartrate of potash) is preferred by some to cream of tartar, for this purpose.

3.—Of *Aroma*.

The aroma, or perfume, is a very unmanageable quality in the manufacture of wines, even when they are purely from the fruit of the vine. In some, it is rapidly dissipated ; in many, it is felt only when they have been kept for several years ; while in others it is formed (as might be done in this country) by the introduction of adventitious substances. The following are in the most general repute : CINNAMON ; CLOVES ; MACE ; VANILLA (*Epidendrum*) ; ORRIS-ROOT (*Iris Florentina* ;) CAPILLAIRE ; the FLOWERS of two species of ELDER (*Sambucus nigra*, and *ebulus*, particularly the latter) ; ROSE-WATER, and SPIRIT of ROSES ; ORANGE-FLOWERS, and what is usually called ORANGE-PEAS ; RASPBERRIES ; the STONES or NUTS of BITTER ALMONDS, APRICOTS, PEACHES, &c. ; ORANGES, LEMONS, &c. ; and AMBERGRIS. We may remark of the latter, however, that although it is the sweetest of all perfumes, when properly combined with others, it becomes very disagreeable when alone and concentrated. We believe that the greater number, if not all, of these aromas may be found in the shops of the apothecaries, preserved under the various names of powders, extracts, tinctures, &c. ; in one or other of which forms, the wished-for perfume is introduced into factitious wines. The wines of the grape seldom require such additions ; each species of wine having an aroma peculiar to itself, and which (if the liquor be lasting) is sooner or later developed. In young wines, this natural perfume is usually covered, or neutralized, by the acid which they contain.

The successful introduction of extraneous flavours and odours into vinous liquors generally requires a considerable degree of art. The odoriferous matter, in most cases, refuses to unite directly with the wine ; and requires the intervention of another substance, which, like the *mordant* of the dyers, by its affinity to each, assimilates the whole in one homogeneous fluid. The connective most usually employed is sugar.

CINNAMON, CLOVES, MACE, and VANILLA, when finely ground,

are best preserved by mixing the powder with an equal weight of pounded sugar: after which, the mixtures should be shut up in well-corked bottles for use. When we make use of the essential oils (in which the fragrance resides) of these or any other vegetable substances, we must form what is called an *oleo saccharum*, before they will unite with wines. This is done by pouring the oil, drop after drop, upon dry pounded sugar, and triturating the mixtures in a mortar. By this means the sugar may be made to absorb about a tenth of its weight of the essential oil, which is thereby rendered soluble in aqueous liquids. On the same principle, the fine flavour of peel of oranges, lemons, and other fruits, is communicated by rubbing the skins with hard loaf-sugar, which, absorbing a portion of the aroma, enables it to unite with a watery fluid.

ORANGE-PEAS (Curagoa oranges) are, as well as *Orange-peel*, kept close, and ground when required. The *Orris-root* is always sold ground, and in a dry state. The *Orange-flowers* are highly odoriferous: they yield their virtues to alcohol, and by distillation, either in water or spirits. The dried flowers lose part of their virtue; but they might be preserved better by mixing them with sugar, and keeping them well corked. The rose flavour is generally found only in distillations; but the petals might be preserved in the same manner. *Capillaire* is a syrup made with the juice of a species of fern (*Adiantum capillus Veneris*) and flavoured with orange-flower water. The *Elder-flowers* are generally preserved in the state in which they are collected; well dried, and corked up in wide-mouthed bottles. When used, it is proper to mix them with sugar, previously depriving them of their stalks; and the extrication of their perfume, which unites with the sugar, may be hastened by putting them in a close bottle and keeping them for some time at a heat of 140 or 150 degrees. This aroma is particularly applicable to sweet wines, because it bears much resemblance to the Muscadine grape.

The raspberry has a very delicate perfume; but it must be taken from the bush the moment that it ripens; for the odour, though fine, is so extremely fleeting, that in twenty-four hours it will probably be gone. If the season allow, the berries may be plucked from the bush and thrown immediately into the wine; but, otherwise, the fruit must be preserved, either by infusion in spirits, or in a syrup, as we make raspberry-jam.

The nuts of *Bitter Almonds*, *Apricots*, *Peaches*, and some other stone fruits, bruised and distilled with spirits,

give a decided and not unpleasant aroma. This spirituous extract, whether made by infusion or distillation, when sweetened with sugar, is the too-famous cordial called NOYEAU (from the French *noyau*, a nut). This liquor contains a notable portion of *Prussic acid*, and is probably the most noxious of all the spirituous compounds. We need scarcely add, that when it is meant to flavour wines with this pernicious cordial, it should not be used in too large a quantity.

Factitious flavours and aromas are used, either single or united. When we wish wine to have a determinate character, such as might have the name of ORANGE WINE, CITRON WINE, &c., we must employ single substances, or ingredients in which the required flavours or perfumes shall predominate. In the proper mixture of flavours and odours, great art, as well as experience, is necessary. *Ambergris*, for example, enters among almost all perfumes, and adds much to their delicacy; but its individual scent is far from agreeable, and therefore needs to be completely masked. This mingling, or, as the French call it, *marrying* of aromas, constitutes the *bouquet* (nosegay) of wines; but no rules can be given for its formation. Savour and perfume depend for their existence upon the organs of taste and smell; and (as is the case with harmony of sounds) he who possesses those senses in the greatest perfection will be most susceptible of discordancy. It is on account of the want of these discriminating faculties, that, when extraneous flavours and aromas are introduced, they are almost always in excess.

CHAPTER II.

OF WINE FROM ENGLISH GRAPES.

WE formerly observed, that the countries most favourable for the produce of the vine lie between thirty-five and fifty degrees north latitude. Those limits exclude the whole of the British Isles, and part of the north of France. Vines are now seldom reared in the open air, with any dependence upon their fruit; though in favourable seasons, in the south of England, they occasionally ripen. This would happen oftener, were any attention bestowed in choosing the earlier

species, and planting them in situations most advantageous to their growth. It appears, from ancient records, that many of our abbeys and monasteries had vineyards attached to them, and that (if we will allow the Monks to have been judges) they produced very good wine. The vineyard of Evesham, which was added to the abbey by Walter, a Norman abbot, was particularly famous; but, indeed, the soil in that neighbourhood is so rich, that large tracts are cultivated by gardeners, who supply the country for thirty miles round it with vegetables.

The most successful experiment, in rearing a vineyard in this country, was that at Painshill, of which we have a very interesting account in Sir Edward Barry's "Observations on Ancient and Modern Wines," published in 1775. This account is given by the proprietor himself, the Hon. Charles Hamilton. "To him," says Sir Edward, "I am particularly obliged for the following exact description, which he has, at my request, given, of the rules he had pursued, and which he has given me leave to publish."

"The vineyard at Painshill is situated on the south side of a gentle hill: the soil is generally a gravelly sand: it is planted entirely with two sorts of Burgundy grapes—the *ACAVERNAT*, which is the most delicate, but the tenderest; and the *Miller-grape*, commonly called the *BLACK CLUSTER*, which is more hardy. The first year, I attempted to make red wine in the usual way, by treading the grapes; then letting them ferment in a vat, till all the husks and impurities formed a thick crust on the top: the boiling ceased, and the clear wine was drawn from the bottom.

"This essay did not answer: the wine was so very harsh and austere, that I despaired of ever making red wine fit to drink; but, through the harshness, I perceived a flavour something like that of some small French white wines, which made me hope I should succeed better with white wines. That experiment succeeded far beyond my most sanguine expectations: for, the first year I made white wine, it nearly resembled the flavour of champagne; and in two or three years more, as the vines grew stronger, to my great amazement my wine had a finer flavour than the best champagne I ever tasted: the first running was as clear as spirits; the second running was *à il de perdrix*; and both of them sparkled and creamed in the glass, like champagne. It would be endless to mention how many good judges of wine were deceived by my wine, and thought it superior to the best

champagne they ever drank : even the Duke de Mire Poix preferred it to any other wine: but such is the prejudice of most people to any thing of English growth, I generally found it prudent not to declare where it grew, till after they had passed their verdict upon it. The surest proof which I can give of its excellence is, that I sold it to wine-merchants for fifty guineas a hogshead ; and one wine-merchant, to whom I sold five-hundred pounds' worth at one time, assured me that he sold some of the best of it at 7*s.* 6*d.* to 10*s.* 6*d.* per bottle.

" After many years' experience, the best method I found of making and managing it was this : I let the grapes hang till they had got all the maturity which the season would give them ; then they were carefully cut off, with a pair of scissors ; and brought home to the wine-barn in small quantities, to prevent their heating or pressing upon one another ; then they were all picked off the stalks ; and all the mouldy or green ones were discarded, before they were put in the press, where they were all pressed in a few hours after they were gathered. Much would run from them before the press squeezed them, from their own weight upon one another. This running was as clear as water, and sweet as syrup ; and all this of the first pressing, and part of the second, continued white : the other pressings grew reddish, and were not mixed with the best. As fast as the wine ran from the press into a large receiver, it was put into the hogsheads, and closely bunged up. In a few hours, one could hear the fermentation begin ; which would soon burst the casks, if not guarded against by hooping them strongly with iron, and securing them in strong wooden frames, and the heads with wedges. In the height of the fermentation, I have frequently seen the wine oozing through the pores of the staves.

" These hogsheads were left, all the depth of winter, in the cool barn, to reap the benefit of the frosts. When the fermentation was over—which was easily discovered by the cessation of the noise and oozing, but, to be more certain, by pegging the cask, when it would run quite clear—then it was racked off into clean hogsheads, and carried to the vaults, before any warmth of weather could raise a second fermentation. In March, the hogsheads were examined ; and if any were not quite fine, they were fined down with common fish-glue, in the usual manner : those that were fine of themselves were not fined down ; and all were bottled about the end of March ; and in about six weeks more they would be in perfect order for drinking, and would be in their prime for above one

year: but the second year the flavour and sweetness would abate; and would gradually decline, until at last it lost all flavour and sweetness; and some that I kept sixteen years became so like OLD HOCK, that it might pass for such, to one who was not a perfect connoisseur. The only art I ever used to it, was putting three pounds of sugar-candy to some of the hogsheads, when the wine was first turned from the press, in order to conform to a rage that prevailed, to drink nothing but the very sweet champagne.

"I am convinced much good wine might be made in many parts of the south of England. Many parts are south of Painshill: many soils may be fitter for it, and many situations must be so; for mine was much exposed to the south-west wind (the worst of all for vines), and the declivity was rather too steep; yet, with these disadvantages, it succeeded, for many years. Indeed, the uncertainty of our climate is against it, and many fine crops have been spoiled by May frosts and bad summers; but a good year balances many disappointments."

CHAPTER III.

OF WINE FROM UNRIPE GRAPES.

ALTHOUGH the fruit of the vine is seldom brought to complete maturity in this country, yet even in its unripe state it may be made to produce wine of a quality which might pass for that of a more favourable climate. The celebrated French chemist, Macquer, was the first who made experiments on this subject; and we know not that the process can be better illustrated, than by detailing the means that he employed, and the results which he procured.

"In the month of October, 1776, I procured from a garden in Paris a quantity of white grapes, sufficient to make 25 to 30 pints of wine*. The grapes were of the worst kind; and I chose them in so bad a state of maturity, that it appeared perfectly hopeless to make them into a drinkable wine. Nearly half the berries, and even entire clusters, were so green, that their acidity was insupportable. Without any

* The old Paris pint contained two pounds of water, and was therefore equal to one-fifth of our new Imperial gallon.

other precaution than merely picking out the spoiled raisins, I caused the rest to be bruised along with their stalks, and the juice to be pressed out with the hand. The *must* was very foul, of a green colour, and had a mixed taste of sweet and sour; in which the latter was so predominant, that it set the teeth on edge. I dissolved in this liquid a quantity of coarse sugar, sufficient to give a good degree of sweetness to the *must*; and, without further preparation, I put it into a cask which stood in an arbour at the bottom of my garden, where I left it to its fate. The fermentation commenced on the third day, and continued for eight days in a very moderate but obvious manner; after which time it ceased to be sensible.

“The wine being newly made, and still thick and impure, had a vinous odour, sharp and lively. The taste was rather harsh, for that of the sugar had disappeared as completely as if it never had existed. I allowed it to pass the winter in the cask; and on examining it in the month of March, I found that, without having been fined or racked, it had become transparent. Its taste, though still a little sharp, was nevertheless much more agreeable than it was immediately after the sensible fermentation had ceased. It was a little more soft and mellow, but it had not the least approach to sugar. It was then bottled, and, on examining it in the month of October, 1777, I found it was pure, fine, very brilliant, agreeable to the taste, warm and generous, and, in a word, like good white mellow wine made from the ripened grapes of a good vineyard in a favourable season. Many connoisseurs who tasted it gave the same opinion, and could not be made to believe that it was produced from green raisins and sugar.

“This success, which had surpassed my hopes, induced me to make another experiment of the same kind; which was still more decisive, on account of the extreme greenness and bad quality of the grapes which I employed.

“On the 6th of November, 1777, I had collected, from the top of a summer-house in a garden at Paris, a species of large *raisin* which never ripens well in this climate, and which we know by the name of *Terjus*, because its juice is chiefly employed in the kitchen, as an acid seasoning. That of which I speak had scarcely begun to colour; although the season was so far advanced, that it had been abandoned, without any hope of its acquiring sufficient maturity to be eatable. It was still so hard, that I was obliged to heat it on the fire before I could extract its juice; of which, at last, I procured from

eight to nine pints. This juice had a very sour taste, in which a slight sweetish flavour was with difficulty discovered. I dissolved in this *must*, portions of common brown sugar, until it tasted very sweet. It required a greater quantity than in the former experiments, because its acidity was much stronger. After the dissolution of the sugar, the taste of the liquor, though very *sweet*, was nevertheless far from flattering; for both the *sweet* and the *sour* were strongly and separately felt, so as to be extremely disagreeable to the palate.

"I put this peculiar *must* into an earthen jar, which it did not entirely fill, and covered it simply with a piece of cloth. The season being already very cold, I placed the jar in a room in which the heat was almost always kept at about 60°, by means of a stove.

"After a few days, the fermentation was scarcely sensible. The liquor seemed to me to be quite as sweet and as acid as before; but the two flavours began to be better combined; and, on the whole, the taste was more agreeable.

"On the 14th of November, the fermentation was in full force; and a lighted taper, introduced into the empty part of the jar, was instantly extinguished.

"On the 30th, the sensible fermentation had entirely gone; and the introduced taper was no longer extinguished. The wine was, nevertheless, still very foul and milky. The savour had retained scarcely any sweet. It was brisk, sharp, and pleasant, like that of warm and generous wine; but it was a little tart and gaseous.

"I bunged up the jar, and placed it in a temperate situation, in order that the wine might improve by completing its insensible fermentation during the winter.

"At last, on the 17th of March, 1778, having examined this wine, I found it almost totally transparent. Its remaining sweet as well as acid taste had completely disappeared. It was that of a wine made from strong, good grapes, and by no means unpleasant; but it had no perfume or *bouquet*, because the *raisin* we call *verjus* possesses no odorous principle: further, this wine, being yet new, having something to gain from the insensible fermentation, promises to become still more mellow and pleasing."

These experiments of Macquer suggested numerous others, all of which were less or more successful; and the practice, in consequence, has become very general in the northern districts of France. We mentioned, under the head of *Sweet*

Wines, that the *must* is often concentrated by evaporation over a slow fire. This is also, sometimes, done in the case of unripe juice; and occasionally the grapes themselves have a part of their water dissipated by decoction.

It is well known, that half-ripened fruits become more mature by keeping, after they have been plucked from the tree. The oranges which are brought to this country are gathered when still green; and this amelioration by time is known to every one, in the preservation of apples, pears, and some others of our home fruits. The acid and mucilaginous parts continue to act upon or combine with one another, so as to produce sugar: it is an imperceptible *saccharification*. This process is hastened by a moderate heat, and retarded by cold. If we have the means of keeping the fruit at a heat of 140 or 150 degrees, we can produce, in a few hours, that *mellowing* which would otherwise require weeks and months. This heat may be produced by piling or keeping in a close room; but it is impossible to have it thereby equally distributed; and the consequence is, that one part, or side, of the berry being in contact with another, is apt to get too ripe, or even putrid, before the other parts are affected. By putting the fruit, without the stalks, upon a common kiln, spread but not piled, and turned very often, this *saccharification* might be readily produced; and in small quantities, a tinned pan of sufficient size might answer the same purpose: but, lest the heat should rise too high over an open fire, it would be much better to immerse the containing vessel into another that is filled with hot water. The alteration may be understood by every one who has tasted a roasted apple.

The *saccharum* produced by coction saves a portion of the real sugar that would otherwise be required; but this is not all. The *saccharum* produced by this imitation of the natural maturation is more congenial to the fabrication of wine. The wine of the pure grape must always differ from that which is produced by a mixture with the wine of the sugar-cane. It is seldom, however, that this *saccharification* is of itself sufficient to form a drinkable wine from the grapes that grow, without attention, in the open air of this country. Sugar is still requisite; but as the acid is in a great measure absorbed, the quantity of extraneous sweet cannot, as in Macquer's experiments, be determined by the taste. The *saccharometer*, in such cases, is the best guide; for though the palate can easily judge at what time the sweet flavour overcomes the sour, it cannot so well ascertain the degrees of saturation.

If the specific gravity of the *must* be under 1056, or 20 pounds per barrel, though it would ferment very well, it would be too weak for preservation without an addition of spirits. Between 1080 and 1090, or about 30 pounds per barrel, is a proper gravity for imitating good French wines. From that to 1140, or about 50 pounds per barrel, forms the range of *must* adapted to making *sweet wines*; but if it weigh much more than this, it becomes too syrupy for a proper fermentation. These strengths should be kept in remembrance; for they apply to every species of factitious wine.

Whether the grapes are pressed as they are plucked from the vine, or after they have been submitted to the ripening process above mentioned, the juice must be raised to the gravity required, by the addition of sugar, which it were better to have previously made into a syrup with hot water. This prepared *must* should then be put, either into a tun, or into a cask, according to the quantity, and, if possible, at a heat of 60°. If into a tun, it should be covered slightly, and racked into a cask the moment the sensible fermentation is finished, sooner rather than later. When it ceases to throw out froth at the bung-hole, it should be stopped close; having a spoil, or peg, at the side of the bung, to let out the carbonic acid gas occasionally, as it arises from the silent fermentation. It is immediately after cleansing that any aromas or spirits should be added. If that were done in the tun, they would be dissipated during the tumultuary process; but in the succeeding stage they would gradually amalgamate with the wine.

If the juice, when expressed, is very acid, a large proportion of sugar will be necessary to saturate the taste; in which case, if a light wine be wanted, the *must* will require to be diluted with water. The best mode of doing so would be to make the syrup thinner, or more watery, before mixing it with the juice. In most of the receipts which we have seen, the water is recommended to be in equal quantities with the juice; but this dilution would, in our opinion, if the grapes were not very young indeed, make a wine, palatable enough, perhaps, when new, but of too little flavour to improve with age. With respect to the addition or the subtraction of the skins and stalks, we must refer to what has been said on that subject when we treated of foreign wines: it is in these parts that the greater proportion of the tartar resides, and in those that are *turned* (that is, begun to ripen) colour also resides in the skin.

CHAPTER IV.

OF RAISIN-WINE.

ACCORDING to Dr. Macculloch, the manufacture of Raisin-wine, although practised on a very large scale by the makers of *sweets*, has never been successful in this country. "The wines," says he, "which are confessedly made in this way are almost always nauseous, whether sweet or dry; and however they may be called by the various names of Lunel, Teneriffe, Sherry, or Canary, they have all the same disagreeable and overpowering flavour. It is probable, that a great part of this peculiarity is owing to the quality of the sugar employed; but it is also to be suspected that the complete drying of the grape develops, in that fruit, some obnoxious taste, which is communicated to the produce."

From the usual method of manufacture, as briefly described by the Doctor, it does not seem wonderful that the wine should be worthless. A quantity of raisins, varying from two as far as seven pounds to the gallon of water, with a proportion of common clayed sugar or molasses, from half a pound to three or four pounds, and an addition of from four to six pounds of crude tartar per cwt., is a recipe which would spoil any raisin in Christendom. In our endeavours to describe the process of the useful arts, we have sought information from every quarter in which we could suppose that it might be found; but, after reading this account of a principal part of their operations, we have been persuaded that it would have been in vain (on this article) to have applied it to the British manufacturers; and we have, therefore, to thank an ingenious, but nameless, foreigner, for the following improvements in the fabrication of *raisin-wine*.

The dried raisin has undergone no disorganization. Fortified by its pellicle and the stalks of its cluster, it preserves the double advantage of fermenting with more rapidity, and of producing, in consequence of that intestine motion, a wine more generous than could have been obtained from the same *raisin* in its original state. Perhaps it will be objected, that the wine, thus produced, cannot remain long in that happy combination which renders it so pleasant, the raisin being deprived of a portion of its acid principle during this completion of maturation. But we are capable of restoring to the dried raisin the constituent parts that are wanting—*water*, and the *tartarous acidule*; and, consequently, we may manage,

at pleasure, to make, with the same raisins, different qualities of wine, such as nature alone could never have done. To be convinced of this fact, we need only to attend to what happens during the drying of the raisins.

In the islands of the Archipelago, and in Spain, the raisin, when it comes to maturity, is dried to a certain extent, by twisting the cluster, to prevent the accession of more vegetable sap; and then allowing it to remain on the tree, exposed to the daily influence of the sun in those warm climates. This, and other modes of concentrating the juice, have been already mentioned, when treating of the *sweet wines*. By one or other of these practices, when carried to its utmost extent, a hundred pounds of raisins may lose, perhaps, three-fourths of their weight; this is, seventy-five pounds of water. It is water only which is evaporated, and the same result might have been obtained by distillation over a water-bath. Without water, there can be no fermentation, and the raisins so dried may be preserved for years.

It will not then be surprising that good wine should be made with dried raisins—wine even more generous and aromatic than could have been produced from the same grapes, had they been pressed at the time of their first maturity; for this secondary maturation not only dissipates the aqueous portion of the raisin, but, by combining the remaining acid and mucilage, it increases the saccharine matter; while, at the same time, it elaborates and fixes more intimately the balsamic principles that are contained in the skin.

There are other processes for the drying of grapes, which are well known at those places where raisins are prepared for exportation. These consist chiefly of one or more immersions in alkaline ley; and subsequent desiccation, more or less rapid, on a kiln, in the sun, or in the shade, according to taste or circumstances. Boiling water might serve for these immersions; but the alkali softens the skin of the fruit: not penetrating into the interior of the berry, it has no effect in neutralizing the acids; it merely favours the evaporation of the watery part, and thus brings the constituent principles in more direct contact with the caloric.

Whatever may be the means employed for its desiccation, it is not less true, that the saccharine principle of the grape is augmented, as well as concentrated; and also, that, in the state of the *dry raisin*, it is still as capable of producing wine of the best quality as it was when plucked from the vine, provided we take care to re-establish its constituent principles. But what have we to do?

It is water that has been taken from the raisin, and a little of its acid has been converted into sugar, during the process of the desiccation. We have only to give back to the raisin the quantity of these two principles which it has lost; and possessing more *saccharum*, it will then be better for our purpose than when it was taken from the tree.

Having, then, made choice of good and well-preserved raisins (for it is obvious that almost every thing depends upon the quality), they are to be carefully separated from their stalks, and minced into small pieces: these are put into a tun, or tub, according to their quantity, and covered with soft water, at 150 or 160 degrees of heat, and well stirred. The fruit swells, and imbibes the water. In this mixture is put a quantity of *cream of tartar* (previously dissolved in a portion of water), equal to the two hundredth part of the weight of the picked raisins employed. When the whole has cooled down to 60 or 70 degrees, the raisins are taken out by means of a sieve, and broken, bruised, and pressed more completely; when they are returned again into the liquor, and left to ferment. When the quantity is large, they are fermented in a tun, and cleansed when the head begins to fall, in the same manner as is directed with respect to common grapes; but, in small quantities, the liquor is put at once into the cask, which must be filled and bunged, and allowed to improve by the insensible working.

The quantity of water is dependent upon the quality of the raisin, and the nature of the wine which it is wished to imitate; and should be regulated by the saccharometer, according to the directions given in the immediately preceding chapter. From five to seven pounds of picked Malaga raisins to the gallon of water ought to make a good ordinary wine. Eight or ten pounds to the gallon would, probably, make a sweet wine, which would require a lengthened fermentation in the cask; but the saccharometer is the only test. If we add a few of the dried flowers of elderberries to the liquor, at the close of the sensible fermentation, we shall have the Muscadine flavour; but the wine of dry raisins, well chosen, has generally a natural aroma; in which case, any addition would be rather hurtful than useful. We may, however, augment its natural perfume, by adding to the mixture of raisin-juice, tartar, and water (before the fermentation) about a quarter of a pound of common salt per barrel.—It is seldom that raisin-wine is fit for drinking in less than twelve months: often, it requires two years.

CHAPTER V.

OF CURRANT-WINE.

UNDER the genus *Ribes*, botanists include all the species and varieties of what gardeners call CURRANTS and GOOSEBERRIES. In the art of Wine-making we distinguish these fruits into three different divisions, each requiring a different mode of manufacture; viz. the *Ribes rubrum*, or common currant, with its two varieties of red and white, or blush-coloured, fruit; the *Ribes nigrum*, quincy-berry, or common black currant; and the *Ribes glossularia*, or gooseberry, which, in all its species and varieties, differs from the currant in the marked distinction of having prickly stems. It is of the first of these (the common currant) that we have now to speak.

1.—*Red and White Currant Wine.*

The common currant has an agreeable sub-acid flavour: the white is less acidulous than the red, and is, therefore, usually preferred in making wine. Both, however, are benefitted by coction; which enables the slight acid to unite with the other parts of the berry, and thereby produces an additional saccharification of the fruit.

Having chosen the ripest currants, expose them for two or three days to mellow. Put them afterwards (wholly) into a close vessel, and raise them, by means of a slow fire, or a water-bath, to the temperature of 145 degrees, in which state keep them during the space of half an hour. Raise the heat then to 170 degrees, and gradually add to the temperature until it reach 200, or something below the boiling point. If we were careful, a common oven would answer the purpose. During this coction, the juice of the currant will be mollified in its pellicle, and will flow clear; whereas, had we bruised it without this preparation, we should have had a thick juice, the viscosity of which would have hindered it from clarifying, and the wine would have deposited a *great proportion* of LEE, which is not the case with good wines.

This operation does not merely change the acid mucilage into sugar; it also combines the aroma and the colouring matter, which resides in the pellicle, with the saccharine principle of the currant. We may add, that after the spontaneous flowing of the juice, the skins &c. (*the marc*) may, if we think it worth while, be mashed with boiling water, and expressed;

and, by the addition of sugar, or some other sweet, be manufactured into an inferior sort of wine; or, by exposure to the atmospheric air, may be converted into vinegar. With respect to our *virgin must*, it is so sweet, that it is not necessary to add any saccharine matter; but, nevertheless, it will be better to employ an auxiliary, in such proportion as will raise its specific gravity to that of the sort of wine which we wish to imitate. We must always keep in mind, that without gravity we can have no alcohol, and that, in this country, without alcohol (or its principle, derived from fermentation) neither flavour nor aroma will generally please. We love what we are unwilling to allow—to be exhilarated; and this, with too many, is only a polite name for the approach to intoxication. Instead of raising the gravity with sugar, (by which we always understand common lump-sugar, if not otherwise expressed), we may use any saccharine substance, such as honey, or the juice of dried raisins. The latter, in particular, adds most materially to the flavour, and gives an aroma of the most agreeable kind. These sweets, whatever be the species employed, are best introduced immediately after the juice of the currants has flowed clear, and before the heat has fallen below 70°: for between that and 65°, the *must* should be all in the working tun or in a cask, waiting the spontaneous fermentation.

The coction in the preceding form of procedure, by neutralizing the acidity of the juice, assimilates the *must* to that of the softer continental grapes. There are persons, however, who love that acidulous flavour of the currant, and who are also of opinion that its aroma is dissipated by the heat. These prefer pressing the berries without previous preparation; and for this mode of manufacture, the following directions, from the pen of the celebrated and lamented Rozier, are minute as well as unexceptionable.

“Take,” says he, “any quantity of currants that you please; but the greater the quantity, the wine will be the more perfect. Collect them when they are perfectly ripe, after the dew and moisture are dissipated, and the heat of the day has become strong. Expose the berries in the sun for some hours at least, and then separate them from their stalks; putting them into a tun, or into a cask, of which one end has been taken out, to serve for that purpose. They are then to be bruised as well as possible, with wooden pestles.

“If the juice appears to be viscous, or too thick, add a few pints of water, but moderately, and only to give it fluidity; because without fluidity there would be no tumultuary fer-

mentation, which is absolutely necessary, for the purpose of separating the constituent principles of the fluids which we wish to put in fermentation, and to assist them, by the division of their parts, in the formation of that ardent spirit which is the soul of all wines.

“ If, on the contrary, the juice is too fluid, and does not contain a sufficiency of the saccharine principle, add a few pounds of sugar; stirring and agitating the whole, until the additional *sweet* shall be perfectly incorporated.

“ Fill your tun (or open cask) to within three or four inches of the top; and put it in a place of a medium temperature (60° or 70° of heat), a situation to which you will be guided by the heat of the weather. If the place were too warm, the fermentation would be too tumultuous and rapid, and the wine would become acid. Cover the tun slightly with a piece of cloth; over which place its wooden head.

“ At the end of a few hours, a whistling noise will be heard, which announces that the tumultuary fermentation is begun. Then the juice begins to occupy a greater space, and rises to the top. Lift up your cover from time to time; and whenever you perceive that the vinous mass begins to sink, draw off your wine into smaller casks; which you must put immediately into a cellar, to guard them from the too great heat of the weather.

“ Leave the casks unbunged for a few days; and in proportion as they throw out their yeast, fill them up carefully with a portion of the same wine, which you must have in reserve for that purpose.

“ When the tumultuary fermentation in the casks begins to diminish, stop them slightly with their bungs, but take care always to fill them up once at least every day. When the fermentation is no longer perceived, bung them close, without any vent.

“ This wine should be suffered to remain two months on its *lees*; after which it may be racked; and it will be found to be a good vinous liquor, *slightly acidulous*, but not approaching in the least degree to what we would term *sour*: it will be true *currant-wine*, and will have preserved all its perfume.

It has probably been for the purpose of guarding against the *slightly acidulous* flavour above mentioned, that all the receipts for making *currant-wine*, which have found their way into cookery-books, or among the manuscript receipts of private families, recommend, as far as we have seen, to mix a large proportion of water with the juice, making up the defi-

ciency of strength with sugar, or more directly with spirits. This heterogeneous mixture, which usually requires the *yeast of beer* before it will ferment, produces a species of shrub rather than wine, to which it bears scarcely any resemblance. If the acid of the fruit, from an unfavourable season, be too abundant, the juice will be found to be deficient in gravity; and the remedy is to be sought for, either in the *coction* that we have recommended, or in the addition of sugar which will neutralize the acidity during the fermentation. It is the flavour and other principles of the fruit, united with *saccharum*, which forms wine; and the added water and sugar, beyond what is necessary, serves only to degrade the mixture. We thereby unite two liquids, currant-wine, and the sugar-wash of the distiller. The forced fermentation too, by the yeast of beer, is peculiarly unfavourable to the true vinous flavour: it always smells of the hop.

2.—*Black-Currant Wine.*

The two varieties (red and white) of the *Ribes rubrum* are used indifferently in the making of currant-wine. The white is generally preferred; but the red, which ripens earlier, is rather stronger in flavour; and a mixture of both, in equal quantities, is commonly recommended in the book-recipes. The *black currant*, *Ribes nigrum*, has a peculiar flavour, which is not agreeable to every palate; and it is probably on that account that we seldom see it recommended for home-made wines. For some of these, however, it is well fitted, and particularly for the imitation of what are termed, in this country, *tent wines*—the *tinted* or high-flavoured sweet vines of Alicante, in Spain. Colour is, assuredly, always at our command, while we possess the juice of the elderberry; but the black currant requires no extraneous ingredient, and, along with its tint, it has also, in some degree, the flavour of the dark Spanish grape. Like the latter, too, it is understood to be *cordial* and *tonic*; and, without any allusion to its produce in the form of wine, it had both these characteristics in the herbals of our forefathers.

For whatever purpose it may be intended, the black currant requires to be gathered at a certain point of maturity. Beyond that period, its flavour becomes partially insipid, and its perfume is lost. When collected at the proper moment, and allowed to lie in a warm place (heated by a stove) for about thirty-six hours, the berries become mellowed, and give out a juice to pressure, of an improved flavour, and otherwise in the best state for any required purpose. With respect to

this *mellowing*, the same methods may be followed as were recommended in the case of the common currant.

The juice of the black currant, although very high-coloured, is seldom of sufficient gravity to make a *keeping* wine, without the assistance of other *sweet*. The quantity of sugar (previously made into a syrup with hot water) should be regulated, if possible, by the instrument; in the same manner as proposed when treating of wine from unripe grapes. We have seen two pounds of sugar (in syrup), and an ounce of cream of tartar (previously dissolved in boiling water), added to a gallon of black-currant juice, with good effect. The fermentation and subsequent operations were conducted as in ordinary currant-wine; and in the course of six months, it had acquired an excellent taste. It was transparent, and the colour beautiful. An additional quantity of syrup would have left it more sweet, in which case it would have approached nearer to the wines of Spain formerly mentioned.

CHAPTER VI.

OF GOOSEBERRY-WINE.

THE gooseberry (*Ribes grossularia*) preserves a high rank among those fruits which are used in the fabrication of our domestic wines. It is, above all, famous in the manufacture of *British champagne*, an imitation which is often fraudulently substituted for the original.

The varieties of the gooseberry cultivated by the British gardeners are extremely numerous; amounting, it is said, to two hundred, differing in the colour, size, smoothness, and shape of the fruit. This shrub is peculiarly adapted to northern climes. "In the south of Europe it is small, tasteless, and neglected; and though it grows to a large size in the warmer parts of England, its flavour there is very inferior to that which it has in Scotland. Even in that country, the flavour seems to increase with the cold; for if there is warmth enough for bringing the gooseberries to maturity and ripening them, the farther north they are grown, the better. The market-gardeners about Edinburgh pay much attention to the culture and kinds of their gooseberries;

but they are never equal in flavour to those which are grown at Dundee, Aberdeen, or Inverness.*

The gooseberry, like the black currant, has a period of maturity, beyond which the juice loses its flavour, and becomes insipid. This is particularly the case with the yellow gooseberry; the variety which, on account of its juicy quality, is chiefly employed in making wine. The fine flavour is here so evanescent, that a single warm day is often destructive to the whole crop of the bush. It is probably on this account that so many of the English recipes recommend making use of the gooseberries before they are ripe, and make up for the want of their natural *saccharum* by an increased proportion of sugar: they catch the flavour, but along with it they have an excess of acid; and the acid of the gooseberry, if not well neutralized, gives a harshness to the wine. We would recommend waiting until the fruit reaches its *point of perfection*, but taking care that it should not be a moment longer ungathered. Every *unripe*, as well as every *over-ripe* berry, should then be picked out and thrown away. If more acid is then thought requisite, the tartaric may be easily introduced, and will best answer the purpose.

The berries thus collected should be squeezed and pressed, and the juice passed through a hair-sieve. To every gallon of the juice a pound or more (according to the gravity) of lump-sugar, in syrup, is to be added, and also about five per cent., in measure, of good brandy. The whole, after being well and repeatedly stirred, should then be put into casks, about seven-eighths full, and closely bunged up. The *must* will gradually vinify, by a silent and protracted fermentation. A peg-hole may be placed near the bung, to be opened occasionally, lest too much gas should be generated. In five or six months the wine will probably be fit for racking.

When gooseberry-wine is meant to be brisk, or what is termed "British champagne," we understand that the berries are, in most cases, taken before they are ripe, and often while they are still extremely acid. This, as already said, we consider as a useless waste of sugar. We grant, however, that the risk lies the other way; for if we allow the natural acidity to be completely neutralized on the bush, we have no pleasing flavour. The varieties of wine from unripe gooseberries are many, according as the juice is fermented with or without the addition of water; and, in the former case, with

* Library of Entertaining Knowledge:—"FRUITS."

the proportion of water which is added. The sugar, too, may be variously proportioned ; and in each of these several cases the wine differs in strength and flavour. In the imitation of champagne, the *must* should never be raised to a high gravity. Twenty-five or thirty pounds per barrel is fully, if not more than, sufficient ; and we believe, that if it could be equally well preserved, it would sparkle better at eighteen or twenty. The time has been (we do not say *now*), when we had importations of champagne from the continent, which was manufactured wholly from gooseberries : the advantage from the price of the berries was little, but the abridgement of labour and time employed was materially advantageous. When, after racking and cleansing, this wine did not readily effervesce, the process was hastened by the injection, either directly or by favouring materials, of carbonic acid, as is done in soda-water and ginger-beer. Perry too, when choice qualities have been produced, has been passed off for champagne ; but this imitation is more a matter of accident than the result of art : for, as we shall afterwards have occasion to shew, the manufacture of that beverage, though of ancient date, is yet in its infancy, with regard to improvement.

CHAPTER VII.

OF ELDERBERRY-WINE.

WE formerly mentioned the elderberry,* when speaking of the *Vin de Fines*, which is made on the continent from that fruit, for the purpose of colouring and flavouring other wines. The berries of either of the English species of *Sambucus*, the *dwarf*, or the *common* elder, are made use of indiscriminately, and are equally good for the purpose.

The berries, which should be collected when ripe, and during dry weather, have to undergo an operation previously to being pressed. They must be exposed to a heat of 170 degrees, either on a kiln, in an oven, or on a water-bath, in vessels convenient for the purpose ; or they may be put in a cauldron, over a naked fire. When they have endured this heat for an hour, they must be carried to the coldest part of the house,

* See page 33.

and left to cool for twelve hours; after which, the same operations of heating and subsequent cooling are to be repeated. The juice may now be simply expressed, if we wish to make ordinary wine; but in manufacturing the *Vin de Fines*, the whole of the berry must be crushed, or trampled, and thrown, pellicles and all, into the tun. In either case, we should add about three pounds of sugar to the gallon of juice, and then leave it to ferment in a covered vessel. The wine which will result from this operation will have no specific quality; but it will nevertheless associate completely with every other sort of *grape-wine*, to which it will give body, an agreeable perfume, and a brilliant colour. It is, however, chiefly valuable for mixing with the wine made from dried raisins; because it relieves the *pasty* taste so common in that kind of wine, and adds, at the same time, the tint and aroma which belongs to the long-kept wines of Spain.

The elder-wine of the London shops (which is generally drunk hot) has been very little, if at all, fermented. The juice has been raised to a gravity of about thirty-five pounds per barrel, by the addition of sugar, or some other sweet; and a pungency given to it, by ginger, cloves, and other spices.—A general description of the method of making wines from fruits without fermentation will be given in a succeeding chapter of this work.

On account of this berry's being tardy in its fermentation, the greater number of recipes advise the addition of a small quantity of brewer's yeast; but this substance is injurious to the flavour of every kind of wine. A very common mode of manufacture is, to dilute the juice with a half or a third part of water; and, after straining the fluid through a hair-sieve, to add lump-sugar, to the extent of about four pounds per gallon. This mixture is then boiled for about fifteen or twenty minutes, with a small portion of ginger, Jamaica pepper, and cloves, the quantity of which is limited to the flavour required. This *must* is then cooled to 70°, and put in a cask to ferment. The yeast (of which we disapprove) hastens the fermentation, and brings forward, in three or four months, what would otherwise require to be kept in the cask for a year at least. The addition of yeast could be more readily dispensed with, if cream of tartar (or, what is reckoned better, crude tartar bruised), dissolved previously in hot water, were added to the *must*. "Considerable differences," says Dr. Macculloch, "in the dose of tartar may be allowed, without producing any correspondent result; and the propor-

tion of this ingredient has consequently been made to vary from one to four, and even to six per cent. The causes of this admissible laxity will be made to appear, when it is considered that the greater part of the tartar is deposited upon the lees."

Professor Christison, whom we quoted at page 50, has endeavoured, in the same Journal, to convince his readers that the common elder is a *poisonous* plant. In proof, he states the cases of two young boys who were some days under his care; one with a violent inflammation of the bowels from the *leaves*, and the other with strong narcotic symptoms from the *flowers*, which they severally ate. In addition, he quotes Withering, Murray, and other writers, for the strongly purgative nature of the inner bark and leaves. He might have said the same of the juice of the berries; which further, in some persons, excites vomiting; and we, ourselves, have seen a marked instance of its narcotic effect, when fermented into wine. Nevertheless, we cannot place the elderberry among the class of poisons, without including, in the same list, all the fermented liquors which are in daily use, and to which this dangerous designation has seldom been applied. Almost every article in the *Materia Medica* (of which the *Sambucus nigra* is one) is poisonous, if taken to excess; and that excess differs with the constitution of the patient. All are poisons in the hands of the ignorant; but that only is entitled to the name, which cannot be tasted with impunity.

CHAPTER VIII.

OF BRAMBLEBERRY-WINE, RASPBERRY-WINE, AND STRAWBERRY-WINE.

1.—*Brambleberry-Wine.*

THE fruit of the common bramble (*Rubus fruticosus*), when properly managed, makes a very pleasant wine. It has the advantage of being very cheap, and also of containing within itself that colouring principle which is found in very few of our native fruits. When fully ripe, its fruit is glossy black; and hence, in many parts of England, it is called the black-berry. On the continent it is termed the wild mulberry, on account of the resemblance of its berry to that of the *mulberry* (*Morus nigra*), a fruit which will come under our observation, when we treat of *cider* and *perry*.

The brambleberry contains much uncombined acid and mucilage, which are capable of being converted into *saccharum*, by exposure to heat, in the manner recommended for the elderberry. It should not be gathered until completely ripe; and, after undergoing the preparation just mentioned, the berries should be put into an open vessel, and as much boiling water poured over them as will just cover them. When the mixture has cooled to the degree of lukewarm, bruise or trample the berries in the liquid until the whole are completely broken. If a high colour is wanted, the pellicles may be left in the *must*; otherwise they may be squeezed, and the juice pressed through a hair-sieve. The skins also contain an extra portion of the flavour of the fruit; but the flavour is not of much value, since a better can be easily substituted in its room. A quantity of sugar (perhaps about two pounds to the gallon) should then be added, according to the quantity of the *must*; but no cream of tartar, because in this sort of wine it is apt to augment its disposition to become *sour*. When the wine has fermented, it is to be cleansed into casks; and it will be well to add a sixth of its bulk of brandy, in order to its better preservation. Its further amelioration must be left to time. If more sugar be added with the spirits (suppose a pound a gallon), the whole will incorporate during the insensible fermentation, and form an excellent *vin de liqueur*.

2.—*Raspberry-Wine.*

The raspberry is the *Rubus idæus*; but, though thus included in the same genus with the brambleberry, it has a very different effect in the manufacture of wine. We have already spoken of its flavour; but that flavour is so exceedingly evanescent, that it almost entirely evaporates during the vinous fermentation, and generally leaves a liquor without any specific aroma. If, at this risk, joined to the expense of the fruit, it is wished to make a trial, we would advise that the berries should be gathered at the moment of their maturity; and that, at the same moment, they should be squeezed; and the juice, mixed with about two or two-and-a-half pounds of sugar, per gallon, should be immediately put into casks, and kept as closely shut as possible, during the fermentation. When that is over, a portion of brandy, perhaps equal to a twentieth of the wine, should be introduced; and the cask, then firmly bunged, must be left to improve by the silent fermentation. A small quantity of raspberry-juice, added at the decline of the fermentation, or a little fresh fruit suspended

in the cask, has been recommended; but, after all, it will probably be found that this wine is more fitted to flavour other wines, than to be drunk alone.

3.—*Strawberry-Wine.*

What we have said of the raspberry, is equally applicable to the strawberry (*Fragaria vesca*); which is still more valuable as an edible fruit, than when made into wine. Indeed, from the price it bears in the market, the value of its juice would be much too high for the manufacture of British wine; and the more especially, as, with all our care, its produce would be much inferior to that of the most ordinary continental wines. Its flavour is delicious when newly gathered, but cannot be arrested in the fermentation. This, as well as that of the raspberry, can only be confined by means of sugar or alcohol; as in the case of preserves, or of unfermented wines, of which we shall afterwards have to speak.

CHAPTER IX.

OF WINES FROM CHERRIES, PRUNES, AND OTHER STONE-FRUIT.

It is the pulp only of stone-fruit that is converted into a vinous liquor. The kernel of the nut is mucilaginous, and might be *malted*; but in most of those fruits it is of a doubtful character, and in some it is believed to be absolutely poisonous. Nevertheless, these kernels, as well as their shells, are, occasionally, made use of for the purpose of injecting an aroma, which is sought after by connoisseurs. "One pint of water," says Dr. Darwin, "distilled from fourteen pounds of *black-cherry* stones bruised, has a very deleterious effect, destroying as suddenly as laurel-water:" and he adds, "It is probable, that apricot-kernels, peach-leaves, walnut-leaves, and whatever possesses the kernel flavour, may have similar qualities." Later experiments have shewn, that this poisonous quality is owing to the presence of a portion of Prussic-acid. The *black cherry* (French *la guigne*, and Scotch *geen*) is infused in a sort of wine at Malaga, which is therefore called *Le vin de cerise*, or *Cherry-wine*.

In some of the Swiss Cantons, and in Germany (especially in the neighbourhood of the Black Forest), a species of brandy

is fabricated from cherries, which is known in other countries by the name of *Kirsch-wasser*, or *Cherry-water*. The manipulations, previous to the fermentation, are conducted in a rather rude manner. The fruit is thrown into a wicker basket placed over a tun, and the ripe and unripe, the good and the spoiled, are indiscriminately mingled. Men, women, and children, squeeze and rub off the pulp, with their hands, upon the sides of the basket, through which the juice flows into the tun, leaving the stalks and nuts behind: the latter are broken, and thrown into the juice, for the purpose of giving an aroma to the spirit. The gravity of this *must* is generally between thirteen and nineteen pounds per barrel. It ferments of itself, without yeast; and in six or eight days is ready for the still.

Although cherries give juice of a higher gravity than most other fruits, they still require an addition of sweet: sixteen or eighteen pounds gravity per barrel is too weak for a generous wine.

When they are ripe, and of the sweet kind, a portion of tartar is indispensable; and is introduced, after the *must* has been brought to the requisite gravity, by means of a syrup of lump-sugar. Thirty pounds gravity per barrel is a good strength, for beyond that we should have a sweet wine.

Morella-cherries are usually preferred, as giving a well-flavoured juice. The mass of pulp, in each case, should be allowed to stand twenty-four hours, and then be strained through a hair-sieve; and the juice is afterwards to be made up to a proper *must*, by means of sugar and tartar, as before mentioned. It is usual to bruise a part of the nuts, and put them in the cask during the fermentation: but the bruising is unnecessary; for it has been found, from experience, that the flavour is equally well communicated, although the stones be left whole. The after-management of the fermentation, racking, &c., being the same as in wines from other fruits, needs not be repeated.

In making wine from prunes, of whatever species, there are two modes which may be followed, but the resulting liquids will be very different from each other. The juice by four or five repeated coctions (conducted in the manner described in the case of the elderberries) may be so concentrated and converted into *saccharum* as to require little, if any, adventitious sweet; or it may be expressed immediately from the pulp, without such preparations, and sweetened by other saccharine substances. In the latter case, malt-wort is peculiarly appropriate: it is cheaper, and coalesces more agreeably with the juice of the

plums than any other sweet. It is thus, we are told, that they fabricate at Hamburg a good imitation of Rhenish wine.

Wines may be prepared from stone-fruits of still humbler kinds. Even the sloe (*Prunus spinosa*) may be subjected to vinification; but, with such materials, several reiterated coccions are indispensably requisite, before their acerbity can be overcome. There is, in fact, no vegetable juice, however harsh or sour, that may not be converted into sweet. That of the sloe is peculiarly astringent, and is said to be frequently employed in giving this latter quality to Port-wine.

The peach contains a very saccharine and finely-flavoured juice, which would doubtless produce a pleasant wine; but the fruit is too expensive, in this country, to be applied to such a purpose. In other countries, and particularly in the United States of America, it is frequently converted into brandy; and is so plentiful, that it is chiefly employed in feeding hogs. We know not that, even there, it is ever fermented into wine.

CHAPTER X.

OF ORANGE-WINE; COWSLIP-WINE; WINES FROM MIXED FRUITS; AND GINGER-WINE.

1.—*Orange-Wine.*

THE citric, next to the tartaric acid, is most consonant with the general flavour of vinous liquors; and, in consequence, lemon-juice has been very frequently added, in domestic wines, to those fruits which are naturally insipid to the taste. Cream of tartar (or crude tartar) is now reckoned better for the purpose; but its use (which has in a great degree superseded the former) is a modern substitute. Dried orange-flowers, and orange-peas, have been long in use, as flavours; and wine with those ingredients is sometimes termed orange-wine. The following, however, is more properly deserving of the name. We shall here specify the different ingredients to be used for a small cask; but the same proportion is to be observed in larger quantities.

Take sweet oranges, of the best quality, 100 in number,

Lemons	20 ditto,
Lump or loaf-sugar	32 pounds,
River water	5½ imperial gallons,
Sherry, or other white wine .	2 bottles,
And yeast, from a table-beer brewhouse,	½ pint.

Dissolve twenty-eight pounds of the sugar in the water, after it has been heated to between a hundred and a hundred and twenty degrees, skimming off any feculencies that may arise to the surface: add to this syrup the expressed juice of the oranges and the lemons; and, when the mixture is well stirred, and cooled to about seventy degrees, put in the yeast, and, mixing the whole well, let it ferment for forty-eight hours. During this time, rub the skins of the oranges and the lemons with the remaining four pounds of sugar, so as to make what is called an *oleo-saccharum*. This mixture is to be added to the fermenting mass, and the whole allowed to work in an open tub for forty-eight hours longer. The *must* is then to be drawn off into casks, mixed with the white wine, and bunged up close as soon as the fermentation will allow. In six or eight months it will be found quite transparent, without the use of any finings; and may then be put into bottles. If the fruit has been good, and the process well managed, the wine will be found to possess a fine flavour, and an agreeable aroma.

Sweet oranges make a very good wine alone, without lemons; but the sugar must be in a less proportion. All the species of *Citrus* *marry* well together, as well as with other fruits; and the bitter or Seville orange, in the proportion of one to six of the sweet, produces a flavour, differing indeed from the mixture of lemons, but to some palates equally, or even more, agreeable.

2.—*Cowslip-Wine.*

The blossoms of the common cowslip or paigle (*Primula veris*) communicate an aromatic fragrance to home-made wines, resembling that of the Muscadel wines of the South of France. They are also, to a certain degree, narcotic; and, in some counties of England, they are dried and infused in hot water; when it is then drunk by the name of *paigle-tea*. These pips, of course, give out no *saccharum*, to assist the vinous fermentation; and the *must* is therefore raised to the requisite gravity by means of sugar; but they are generally infused in such a large proportion, as to entitle the liquid to the name of *cowslip-wine*. The following are tried directions.

To every gallon of water add three pounds of lump-sugar; boil the mixture for twenty minutes, or half an hour, skimming any feculencies that may arise; and then turn it out to cool. When it has cooled to between seventy and eighty degrees, put the liquor into an open tub, and add some good

fresh yeast ; which, that it may be equally diffused, should at first be whisked up with about twice its quantity of the liquor, at from eighty to ninety degrees. A pint of good yeast will be sufficient for twenty gallons.

While the *must* is fermenting, provide half a peck of the pips for every gallon of the liquor ; cut them small, and put them into a cask, along with the juice of two lemons and one Seville orange, and the peel of one lemon pared in thin slices also, for each gallon. When the *must* has fermented in the tub for about thirty-six hours, less or more as it works (but before the head falls), cleanse it into the cask upon the ingredients above mentioned. The cask should not be quite full, but allowed to continue the fermentation, stirring the liquor every day until it begins to lose all signs of working. A bottle of brandy may then be added to every five gallons, or, what will be still better, two quarts of good white wine to the same quantity. This should fill the cask, which must be bunged up. In five or six months it will probably be pure, and fit for bottling.

3.—*Wine from Mixt Fruits.*

There are many gentlemen who prefer wines made from mixt fruits to those of the simple kinds ; and the varieties of these may be as numerous as we please ; for they may be made up of some or all of the fruits that ripen at the same season, and in variable proportions. The following Recipe for making a highly-prized family wine of the mixt kind is extracted from the Eleventh Volume of the Correspondence of the “ Bath and West-of-England Agricultural Society : ”

“ Take black, red, and white currants, ripe cherries (Black-hearts are the best), and raspberries ; of each an equal, or nearly an equal, quantity ; if the black currants be the most abundant, so much the better. To four pounds of the mixed fruit, well bruised, put one wine gallon of clear soft water : steep three days and nights, in open vessels, frequently stirring up the mass ; then strain through a hair-sieve. The remaining pulp press to dryness. Put both liquids together ; and to each gallon of the whole put three pounds of good, rich, moist sugar, of a bright yellow appearance. Let the whole stand again, three days and nights, frequently stirring up as before, after skimming off the top. Then turn it into casks ; and let it remain, full and purging at the bung-hole, about two weeks. Lastly, to every three gallons put one quart of good brandy, and bung close. If it does not soon

drop fine, a steeping of isinglass may be introduced, and stirred into the liquid in the proportion of about half an ounce to nine gallons.

“N.B. Gooseberries, especially the largest, rich-flavoured, may be used in the mixture to great advantage. But it has been found the best way to prepare them separately; by more powerful bruising or pounding, so as to form the proper consistence in pulp; by putting six quarts of fruit to one gallon of water, pouring on the water at twice—the smaller quantity at night, and the larger the next morning. This process, finished as aforesaid, will make excellent wine; but this fluid, added to the former mixture, will sometimes improve the compound.”

The author of the preceding communication (Mr. Matthews) adds, that he has manufactured several hogsheads by the method here given; and that “the wine was pronounced of an excellent quality.”

4.—*Ginger-Wine, and Ginger-Beer.*

We conjoin these articles, because, in fact, they are the same; except that the former is more completely fermented, for the purpose of preservation; whereas the latter is made for immediate use, and bottled in such a state as to acquire, almost immediately, a high state of elastic fermentation, similar to that of champagne. Every one who has been accustomed to the bottling of beer must have observed, that the ripening (or formation of carbonic acid, which is the cause) is much more rapid in weak ale than in strong; and that when the gravity of the worts has been high, the ale, however long kept, merely creams on the surface of the glass, and never acquires that degree of briskness which causes a weaker ale to push out the cork and fly to the ceiling of the room.

The following Recipes have been generally followed and approved:—

For Ginger-Beer.

For every gallon of water, take
2 pounds of loaf-sugar, and
1 ounce of bruised ginger:

Boil the whole for half an hour, skimming the refuse; and then add, while hot,

1 ounce of cream of tartar, and
1 small lemon, sliced.

After the mixture has cooled down to between 70 and 80 degrees, add some fresh yeast: the quantity cannot be exactly ascertained, being dependent on the quality, and also on the number of gallons of the liquor: a table-spoonful to the gallon, in some cases, will be sufficient; but this part of the process must be managed as in the brewing of small-beer. When the tumultuary fermentation has finished (which may be in twelve or fourteen hours), it must be drawn off and bottled, without waiting for a greater attenuation. The period of ripening will vary with the temperature of the atmosphere.

The proportion of the ingredients above mentioned may be varied, in some degree, to suit the taste of the drinker. The lemon, in particular, is by different makers increased so as to have a very marked effect; while there are others who use none at all, but insert a larger dose of the cream of tartar. The sugar, too, may be in other proportions. Two pounds per gallon would make a wort which might probably weigh twenty-six or twenty-seven pounds, by the saccharometer; but much of what is made for sale, we are convinced, is not above half that gravity: it is made one day, and drunk the next. There are other modes, too, of manufacture for the stalls in the streets, which we do not choose to remember.

Ginger-Beer Powders.

Ginger-beer is sometimes made instantaneously, by means of powders, by which a hasty extraction of carbonic acid gas is obtained.

Take 5 scruples of loaf-sugar, powdered;
 5 grains of ginger, also powdered; and
 25 grains of sub-carbonate of soda:

Mix together, and fold in blue paper.

Then take

30 grains of powdered tartaric acid:

Fold this in white paper, for distinction.

These two powders are sufficient for half a pint of water. The best way is, to divide the water into two equal portions; and put the first-mentioned powder into one tumbler, and the tartaric acid into the other. Then mix the two liquors, and drink the mixture while the effervescence is going on.

Ginger-Wine.

To have this wine of a good quality, the *must* (or wort) should not weigh less than forty pounds per barrel, by the

saccharometer; and to produce this gravity, it will require at least three pounds of loaf-sugar per gallon. The quantity of powdered ginger may be from an ounce to an ounce and a half, the gallon; and, to ensure a sufficient extract, it might be as well to boil it for some time in the water, before the sugar were added. The cream of tartar (an ounce per gallon) may be previously dissolved in boiling water; but very good wine is generally made by boiling all together for three quarters of an hour, along with the rind of a lemon to each gallon, if the citric flavour be preferred to an increase of the tartaric acid. When the whole is well boiled and skimmed, the liquor is cooled as quickly as possible, and put to a small portion of yeast. It should be fermented more carefully than the ginger-beer; and cleansed into a cask, so as to undergo the silent fermentation, as has been directed in the case of other wines. Some direct, that in this stage a portion of brandy should be put into the cask, to the extent of a pint to ten or twelve gallons. If this be thought necessary, the spirit should be introduced immediately before cleansing; but we have before said, that we are not in favour of these spirituous mixtures (at least in fermented wines), and would rather have its alcoholic quality produced by what is generated during the fermenting process which it undergoes. If more spirit is wanted, let the *must* be stronger, at the risk of its requiring longer time before it is sufficiently pure for drinking. How long this shall be, cannot be ascertained beforehand; but, in general, this sort of wine is ready much sooner than almost any other, and will seldom require to be fined down, if care is taken in the management. We have seen it, with three pounds of sugar to the gallon, become fit for drinking in two months, and it has the advantage of keeping well.

CHAPTER XI.

OF WINE FROM HONEY, OR MEAD.

THE Greek *methu* was a strong vinous liquor; which was probably distinct from *oinos*, though both are translated by the Latin *vinum*, 'wine.' *Methymnaios* was a cognomen of Bacchus; and *Hymettus*, a mountain in Attica, was celebrated, by the Roman poets, for the quality of its *honey*.

Mead and *metheglin* (like *ale* and *beer*) being charged with

the same duties, are conjoined in the books of Excise ; but there was likely some difference in the original mode of manufacture, which gave the separate designations : both, however, were undoubtedly prepared with honey. *Mead* is the Saxon *medo* or *medu* ; but Minsheu says, that the term *metheglin* is Welsh, and that it denominated a liquor compounded of honey and wine. Whether this distinction be accurate or not, we have sufficient evidence of such mixtures being practised in former times. Dr. Henderson, in his "History of Ancient and Modern Wines," has collected some curious information on the subject ; a portion of which we shall take the liberty to extract, referring to the work itself for further interesting particulars.

"In order to cover the harshness and acidity common to the greater part of the wines of this period [the reign of Richard II.], and to give them an agreeable flavour, it was not unusual to mix honey and spices with them. Thus compounded, they passed under the generic name of *piments* ; probably because they were originally prepared by the *pigmentarii*, or apothecaries ; and they were used much in the same manner as the *liqueurs* of modern times. 'Our poets of the thirteenth century,' says Le Grand, 'never speak of them but with rapture, and as an exquisite luxury. They considered it as the master-piece of art, to be able to combine, in one liquor, the strength and flavour of wine, with the sweetness of honey, and the perfume of the most costly aromatics. A banquet at which no piment was served would have been thought wanting in the most essential article. The archives of the Cathedral of Paris shew, that, in the thirteenth and fourteenth centuries, the Deans of Châteaufort were obliged to provide a regular supply of piment for the Canons, at the Feast of the Assumption. It was even allowed to the monks in the monasteries, on particular days of the year. But it was so voluptuous a beverage, and was deemed so unsuitable to the members of a profession which had forsworn all the pleasures of life, that the Council of Aix-la-Chapelle, held in the year 817, forbade the use of it to the regular clergy, except on the days of solemn festivals*."

"The varieties of piment most frequently mentioned are the *Hippocras* and *clarry*. The former was made with either white or red wine, in which the different aromatic ingredients were infused ; and took its name from the particular sort of bag, termed *Hippocrates' sleeve*, through which it was

* Vie Privée des François, Tom. III. p. 66.

strained."—" *Clarry*, on the other hand, was a claret or mixed wine, mingled with honey, and seasoned in much the same way." "It is repeatedly named by our early poets; and appears to have been drunk, by many, fasting, or as a composing draught before they retired to rest.—Of these medicated liquors, the only kinds still in use are, the *Wermuth*, or *Wormwood-wine*, which is manufactured in Hungary and some parts of Italy; and *Bishop*, which is prepared by infusing one or more toasted Seville oranges in a certain quantity of Burgundy or other light wine, and then sweetening the whole with sugar."—"When old Rhine wine is used, it receives the name of *Cardinal*; and when Tokay is employed, it is distinguished by the appellation of *Pope*."

Honey, and the juice of ripened fruits, are the earliest fermentable substances of a pastoral people; while malted grain is the later resource of the Northern agricultural nations. The travels of *Ohler*, and *Wolfstan*, in the ninth century, as recorded by King Alfred, in his Saxon translation of *Orosius*, presents us with a curious document on this subject. It appears that the Slavonic tribes, the ancient inhabitants of the shores of the Baltic and the banks of the Vistula, were for a long period unacquainted with malt-liquors; and that *mead* was the popular beverage, while wine and fermented milk (the *kumiss* of the modern Tartars) were the favourites of the great. The following is a nearly literal English translation of the paragraph to which we allude:—

"This Eastern country (*Wolfstan* related) was very large, and contained many cities, each of which had its king. Great plenty of honey and fish were there. The king and the richest men drank mare's milk; but the poor and the servants drank *mead*. There was much wine; but there was no ale brewed among the Eastern people, for they had *mead* in abundance."

So general was the brewing of mead among the Germans, that *Meth* is with them a generic name, including various species, according to the other fluids with which the honey is mixed. Thus, *Weinmeth* is made of wine and honey; *Biermeth* is made of beer and honey; *Essigmeth* (oxymel), of vinegar and honey; and *Wassermeth* (*hydromel*), or simply *Meth*, of pure water and honey. The latter, when preserved in the state of syrup, is *honey-water*; when fermented, it is *mead*; and in either use, it is white or yellow, according to the colour of the honey from which it is brewed. In addition to these compounds, there is a sort of *liqueur*, common in the Highlands of

Scotland, made of strong whiskey in which honey is intimately dissolved by careful trituration. This mixture is generally known by the name of *Athol brose*: it has a pleasant taste, and is considered, by the natives, as an excellent morning dram.

The honey, as it is extracted, is of two kinds. One is that which runs off spontaneously from the inverted cells; and the other, what is subsequently obtained by heat and the pressure of the combs. The former is more liquid and transparent: the latter is higher coloured, and impregnated with impurities from the wax. The finest of all is the first produce of a swarm: the wax of the combs is then clean, and their contents are, in consequence, pure and white: this unadulterated fluid is called *Virgin honey*. The honey of the shops is seldom, if ever, pure; for, besides the foulness and discoloration which it acquires from the combs in which young bees have been bred for successive seasons, and the careless mode of expressing them, the dealers frequently use flour and other mixtures for the purpose of increasing the quantity. There is, therefore, scarcely any honey in the market that can be depended on for making good mead, without undergoing a previous clarification; and, even then, much of it will be found to have contracted a disagreeable flavour, which it is impossible to remove. The usual mode of forming the *mel despumatum*, or clarified honey, is to expose it to a heat of from 90° to 100°: it then becomes thin, and throws up the wax, flour, and other impurities, to the surface, where they are skimmed off as long as they rise. A longer continuance of the heat would dissipate the aqueous particles of the aroma. When great nicety is required, the clarification is assisted by whites of eggs or charcoal.

Pure honey is wholly soluble in cold water; but as, in practice, it is never pure, a degree of heat and consequent scumming is generally employed, when making it into mead. Macquer, who was a practical as well as a theoretic chemist, recommends the mixture of pure honey with something more than its weight of water; and to boil this liquor until its consistence is such as to support a fresh egg on its surface without sinking more than half its bulk. The liquor is then to be strained into a cask, which is to be kept, not quite full, in a temperature of from 80 to 90 degrees; the bung being slightly covered, but not closed. The fermentation will continue for two or three months, according to the degree of heat; and, during the latter part of that time, the cask is to

be filled up occasionally with more liquid (preserved for the purpose), so as to favour the overflow of the yeast. When the fermentation ceases, the cask is to be deposited in a cellar, for twelve months, at least, before bottling.

Must that bears an ordinary fresh egg about half its bulk above water, as above mentioned, indicates an immense gravity, compared with any other *must*; being about 75 pounds per barrel. This natural instrument of the old chemists was that by which they judged of the strength of their alkalies and other liquids, before the invention of the hydrometer with its marked stem; and hence the egg-shape of this latter instrument. The saccharometer, as the brewers now have it, is the most convenient criterion of the gravity of the honey-water, as it is of that of malt-worts: the gravity, like that of the other vinous liquors, may be thereby regulated to any requisite degree, and should be made to conform with the period which it is to be kept before drinking. Honey is slow in finishing its fermentation; and a liquid containing between four and six pounds per gallon may, in many situations, retain an excess of sweetness for years. It will ameliorate, with time, so as to rival the finest foreign wine; but years are waited for with impatience, and therefore flavours are in most cases added, to cover the over luscious taste. Cinnamon, ginger, cloves, and mace, have all been made use of and recommended in various proportions; and, in order to hasten the fermentation, brewer's yeast is also generally added; the least portion of which generally hurts the flavour. The mixture of the juice of fruits, such as currants and gooseberries, is also common; but the liquid then ceases to be mead, and becomes a mixt wine.

Honey amalgamates extremely well with malt worts; so much so, that these two sweets may be advantageously mingled, in any proportions. In making strong ale, which is meant to preserve its sweetness for a length of time, along with an alcoholic strength derived from a good degree of attenuation, honey seems to be almost a necessary ingredient. We recommended it in the "Art of Brewing," when speaking of Burton-beer; and we are still convinced of its utility in the imitation, and even improvement, of that liquor. To those who dare use it (honey being still illegal to the brewer for sale), we should judge it better to use double the quantity there specified. Two pounds per barrel would give a decided flavour; and with the addition of sulphate of lime, used in the manner which we have there stated, a malt wort of forty pounds per barrel

would form a very pleasant and permanent *sweet wine*. Hops in this case are unnecessary; but a portion of tartaric or citric acid might add an agreeable zest.

Mead is seldom fermented without yeast; and this is the chief cause of the disagreeable flavour of which so many of the modern mead-makers complain. The boiling of *musts* of all kinds retard the fermentation; and the perfect clarification of honey is seldom finished without a long exposure to heat. Were the honey simply dissolved in water, of a heat between eighty and ninety degrees, it would enter into fermentation in ten or twelve hours; whereas, when previously boiled, it may stand unaltered for as many days.

In Russia, a species of Cherry-wine is made by sweetening with honey instead of sugar. The cherries are pulled when ripe, and crushed, stones and all, in a tub. The pulp is then sweetened, at pleasure, with honey; and a portion of wine or of brandy is also added. The whole is then raised to a heat of 75 to 80 degrees of Fahrenheit, and fermented with a little yeast; and when it has ceased working, it is poured into casks or large bottles, and placed in a cool cellar, to ameliorate. The wine or brandy is often omitted; and an additional quantity of honey gives it a sufficiency of spirit. A similar practice is followed in making wines from other species of fruit.

Meud is prepared in France in various ways; but the following is the most usual Recipe:—

Take six gallons of boiling water, in which infuse eight or ten ounces of elder-flowers. When the infusion has stood in a warm place about a quarter of an hour, add two pounds of cream of tartar, which may be rendered more soluble by the addition of a few grains of boracic acid. When the infusion is cooled to about 120 degrees, mix it, gradually, but completely, with forty pounds of purified honey, or whatever quantity may be necessary to raise the *must* to the specific gravity that is required. At the same time, introduce about four or five pounds of good fresh yeast; and keep the whole in a temperature of between 80 and 90 degrees. The rest of the process, with respect to cleansing &c., may be conducted as has been already described in the method followed by Macquer.

In that country, too, honey is used along with, or instead of sugar, in the manufacture of Currant-wine. The following proportions are recommended, in a recently-published scientific Journal:—

Dissolve eight pounds of honey in fifteen gallons of boiling water; to which, when clarified, add the juice of eight pounds

of red or white currants. Ferment this mixture for twenty-four hours, and then add fifteen pounds of sugar. The preparation is afterwards clarified with the whites of eggs and cream of tartar.

CHAPTER XII.

OF WINE FROM MALT ; AND FROM THE SAP OF TREES, OR OF ROOTS.

1.—Of *Malt-Wine*.

PURE worts have an agreeable sweetness, with very little extraneous taste ; and if fermented without yeast, or at any rate with a very small portion, unmixed with hops, wormwood, or any other bitter ingredient, constitute a vinous liquor, which is well fitted for the reception of flavours in imitation of many species of foreign wines. In fact, malt worts are neither the dearest nor the worst bases for the manufacture of sweets. Having already treated so largely on the brewing of malt-liquors, we need only refer to the Treatise on Brewing for the description of the process. A very fine ale is by no means an inferior wine ; and we have seen one of a forty-two pound gravity, brewed from very pale malt, without hops, which was flavoured with citric acid, attenuated to twelve pounds in the tun, and kept in the casks a twelvemonth, until it weighed only five pounds per barrel ; when it had acquired a flavour much more similar to a good foreign wine, than to ale.

There is a species of *vin de liqueur*, from malt, which is sometimes seen at the tables of the Scotch-ale brewers. A pale wort of a very high gravity (between forty and fifty pounds per barrel) is attenuated down to half its weight : in this state it is cleansed ; and a gallon of good French brandy is added to a ten-gallon cask of the liquor. The spirits become perfectly incorporated by the subsequent insensible fermentation ; and the wine, when a year old, passes readily for an importation of a favourite foreign growth. This wine is usually drunk without other additions ; but may be flavoured with elder-flowers, or any of the other aromas formerly mentioned.

Before quitting the subject of malt-wine, we must not neglect a Recipe which was published, nearly thirty years ago, by the late Dr. A. Hunter, of York : and, as it is not every-

where to be met with, we are persuaded that our readers will not be displeased to see it, in that learned and humorous gentleman's own words :—

“ Take of sweet wort, about the strength of table-beer, any quantity : to every gallon of wort, put a pound and a half of lump-sugar : boil the liquor for the space of half an hour, and, when about the warmth that yeast is set on, tun it into a barrel ; and to each gallon put two pounds of Malaga-raisins a little chopped, two ounces of dissolved isinglass, and one spoonful of yeast. Stir the liquor every day, with a stick, during a fortnight or a month. Keep the bung tightly in, till the fermentation ceases ; when a gallon of brandy should be put to every sixteen gallons of liquor. Then bung up the cask ; and let the wine stand for the space of twelve months, when it may be racked off or bottled. Some persons put three ounces of hops to every thirty gallons of wort. This wine improves greatly with age.

Observation.

“ The wine of Portugal, so congenial to the British constitution, is now so heavily taxed, that the middling class of people may be fairly considered as deprived of its enjoyment. And, as every man is desirous of rendering the burdens, laid upon him, as light as possible, an ingenious gentleman contrived the above wine, of which the basis is malt. For some years the gentleman enjoyed, exclusively to himself, this cheap domestic comfort ; but now, by the severest law, he is deprived of that enjoyment, by a late additional tax upon malt and raisins. I conceive that the minister learns this piece of torturing ingenuity from the sportsman, who, when he means to unkennel a fox, orders all reynard's retreats to be stopped up early in the morning ; so that, when the poor animal expects to be safely lodged against his pursuers, he finds his own doors shut against him. Distressed and fatigued, reynard is now forced to depend upon his own strength, which generally fails him ; and, in the end, he falls a victim to the speed of the hounds and the ingenuity of the huntsman.—*De le fabula narratur !*”

2.—*Of Wine from the Sap of Trees, or of Roots.*

Besides the juice of the sugar-cane, there are many vegetable saps that are either already saccharine, or contain matters which are easily convertible into *saccharum*. All these are capable of undergoing the vinous fermentation, and thereby producing some species or other of wine. Their value in this

respect depends on their gravity, and the flavour of the other ingredients which they contain. The former may be improved by the addition of other sweets; but there are, in certain cases, acrid mixtures, which it is difficult, if not impossible, to remove or neutralize. The beet-root is an instance of the latter kind: the juice, when properly cultivated, and in good years, has sometimes a gravity as high as 1065, or $23\frac{1}{2}$ pounds per barrel; and the sugar extracted, in France, from this juice is as pure as that of the sugar-cane. Under the best management, however, it is still dearer than grapes; and the juice, as it comes from the press, is too harsh to be manufactured into wine. Carrots seem to promise better; but we have not seen them fermented. Parsnips are said to be rasped and brewed into a species of ale, in some districts of Ireland; and we have no doubt that if their juice, or even that of common turnips, were raised to a proper gravity by means of common sugar, and the *must* acidulated with cream of tartar, a passable species of wine might be produced. The following process, though we have not seen it performed, seems well enough adapted to the purpose. In this receipt, no acid addition is mentioned; and probably the parsnip has of itself a sufficiency of flavour. In making use of turnips, we should judge that a portion of lemon-juice, or of tartar, would be necessary.

Parsnip-Wine.

To every three pounds of parsnips, cut into slices, add a gallon of water, and boil it until they become quite soft. Squeeze the whole through a sieve; and to every gallon of the juice add three pounds of loaf-sugar. Boil again, about half-an-hour; and, after cooling to about seventy degrees, put the liquid in an open tub, in the same manner as beer, stirring it every day from the bottom. When the head begins to fall, cleanse it into a cask; which should be filled up from time to time, and allowed to discharge its yeast from the bung-hole. When it has finished its apparent fermentation, it should be bunged close, and allowed to ameliorate for twelve months; when it may be racked off, and put into bottles.

Birch-Wine.

The saps of the *Birch* and of the *Plane-tree* (*Betula alba*, and *Acer pseudo-platanus*) have both been frequently made into wine in this country. The latter tree is tapped for that purpose in the Highlands of Scotland; but it would seem

that the birch, though exceedingly plentiful, is not fermented in that quarter of the island.

“There is another use” (says Lightfoot, in his *Hora Scotica*) “to which this tree (the birch) is applicable, and which I will beg leave strongly to recommend to my Highland friends. The vernal sap is well known to have a saccharine quality, capable of making sugar, and a wholesome diuretic wine. This tree is always at hand; and the method of making the wine is simple and easy. I shall subjoin a Recipe:—

“In the beginning of March, while the sap is rising, and before the leaves shoot out, bore holes in the bodies of the larger trees; and put funnels therein, made of elder-sticks, with the pith taken out; and then put any vessels under, to receive the liquors. If the tree be large, you may tap it in four or five places at a time, without hurting it; and thus from several trees you may gain several gallons of juice in a day. If you have not enough in one day, bottle up close what you have, till you get a sufficient quantity for your purpose; but the sooner it is used, the better.

“Boil the sap as long as any scum rises, skimming it all the time. To every gallon of liquor put four pounds of sugar; and boil it afterwards half-an-hour, skimming it well; then put it into an open tub to cool, and, when cool, tun it into your cask. When it has done working, bung it up close, and keep it three months: then either bottle it off, or draw it out of the cask after it is a year old. This is a generous and agreeable liquor, and would be a happy substitute in the room of the poisonous whiskey.”—We may add, that *Birch-wine* is common in Norway.

The manufacture of the juice of the Plane-tree is conducted in the same way; and the wine is said to be equally good. The American maple, *Acer saccharinum*, is a tree of the same genus. It is tapped in a similar manner, as above described; and the juice is boiled and clarified into sugar, in nearly the same way as is practised with the cane in the West Indies.

The Beet-root, so much cultivated in France for the sake of its sugar, makes, as might be expected, very good beer: and it should always be borne in mind, that beer and wine differ only in consequence of the hop, or other bitter ingredients which the former has been accustomed to receive. The beet-root is washed, cut into thin slices, and boiled about half-an-hour; when it is submitted to the press, until the juice has ceased to flow. It is then boiled with the requisite quantity of hops, until it has acquired the gravity, by the sac-

charometer, which is wanted. It is afterwards fermented and cleansed, in the same way as is done in brewing malt-liquors.

Excellent strong ale has been made in this way; and we see no reason why a very passable wine may not be produced from the same material, provided some means were used to cover or destroy that harshness which its juice always has, when first extracted. When *Mangel-wurzel* (a variety of the Beet-root) was in fashion in this country, it furnished many of the farmers with good and well-flavoured beer, which was much cheaper than what could be made from malt, while loaded with the present duty.

CHAPTER XIII.

OF THE MANUFACTURE OF WINE FROM FRUITS, WITHOUT SUBJECTING THEM TO FERMENTATION.

THIS class of wines are species of diluted preserves; and, if well prepared, are fully as agreeable (and probably as salutary) for children, and persons of delicate constitutions, as wines that have passed through the stages of the vinous fermentation. They have, besides, this material advantage, that they can be made perfect in a few days; whereas the others often require years to ameliorate, before they can be drunk with pleasure. They may, too, be made as *generous* as we please; for what is called the *generousness* of wines depends upon the quantity of alcoholic principle which they contain. The manufacture of the liquids of which we are now to treat is little practised in this country; but it is well known on those parts of the continent where, on account of their possessing the best products of the vine, we should least of all have expected to have met with those instructions that we here condense for the use of our readers.

1. *Of Cherry-Wine.*

Gather the cherries when perfectly ripe, pick them from their foot-stalks, and bruise them *together with their stones**: then put them into a copper vessel, and expose them to the heat of a slow fire, or to that of a baker's oven not too warm, in the manner directed in Chapter II. when speaking of

* See Chapter IX. as to the propriety of this practice.

currant-wine. After half-an-hour of this slow and gradually increased heat, the pulp is to be spread out into earthen vessels, and left to cool for eight or ten hours, when the operation is to be repeated; and so on, for three or four times, until the saccharification of the juice is considered as completed.

These reiterated coctions will have reduced the weight of the cherries nearly a third: thus, if we have employed twelve pounds, there will be about four pounds of the water of vegetation evaporated. To make up for this waste, we must substitute four pounds of good red wines, which we are to throw upon the pulp, after taking it, for the last time, from the fire. The cherries have, we suppose, preserved about eight pounds of their fermentable matter, all the watery parts being evaporated; and these eight pounds would, if well fermented, produce about two pounds of proof spirit. Two pounds of good brandy should then be added, and intimately mixed with the juice; which degree of spirituousity will produce very generous wine. After it has been in a stone can, or in bottles, for some time, to deposit, it may be poured off carefully from its sediment, through a fine sieve, and set aside for use. It may be observed, that the above weights, as well as the quantity of spirits, are merely general proportions; and neither fix the quantity that may be made at a time, nor the alcoholic strength of the wine.

Another Method.

Take *geens*, or any other of the sweet varieties of the cherry; mix and bruise them, and pick out the stones. At the end of twenty-four or thirty-six hours, put the pulp under a press, and squeeze out the juice. To every gallon of the juice add four and a half pounds of grated or pounded lump-sugar, and a quantity of brandy equal to half the measure of the mixture, after the sugar has been dissolved. The proportion of sugar should be calculated upon the whole of the *must*, the brandy included.

Leave the liquid to settle, and then put it into bottles. If it be not clear, fine it down, and draw off the transparent part with a siphon. This wine may be drunk immediately; but it will be better, if kept for a few months.

It is said, that the flavour would be much improved by using *noyau*, in place of brandy; but this spirit, which is distilled from brandy, in which the bruised kernels of stone-fruits have been macerated, is, we should suppose, a dangerous ingredient to be mixed in such a proportion.

The cherries, in the preceding process, not having undergone the saccharification which the repeated coctions produce, the price of the wine is materially increased by the quantity of sugar which it requires. It is, however, a very excellent liquor, and might readily pass for a real *Ratifica*.

Wine from White Cherries.

By reiterated coction, this cherry, as well as the black and sweeter varieties, may be made into a very good wine, without the assistance of any other saccharine matter. After it has been slightly heated and cooled several times, mix thirty pounds of the juice with a gallon of good white wine, and a quart to half a gallon of brandy. A few of the broken stones will add to its flavour. It is allowed to settle, and racked and clarified as before directed,

2.—*Unfermented Wine from Mixt Fruits.*

These may be made with various fruits, and in various proportions. The following example will explain the general principle on which every kind should be concocted.

Composition.

Cherries	10 parts
Gooseberries	4 ..
Wild-cherries or geens	3 ...
Raspberries	3 ..

Preparation.

These fruits should be gathered when perfectly ripe. Bruise the first three sorts together with the stones; and then increase their *saccharum* by two or three coctions, as directed in the case of *cherry-wine*. Add the raspberries afterwards, at the moment when the other pulp is drawn finally from the fire.

If you now calculate your *marc*, at an average you will have about thirty pounds of juice from every forty pounds of fruit; but since the evaporation has reduced your juice by a third or ten pounds, you must replace this loss by ten pounds (about a gallon) of wine. You have now about thirty pounds of liquid; but of this, twenty only belongs to the juice of the fruit. This juice, if fermented, is capable of producing a certain quantity of alcohol; we shall suppose four pounds of proof spirit. But we do not intend to ferment it; and therefore, to give our liquor the degree of spirituousity which it would have acquired from the fermentation, we must add half a gallon of good brandy or

other pure spirit. If we wish the wine to be more sweet, we can add loaf-sugar. Let the whole mixture be then pressed through a hair-sieve, so as to keep back the *marc*; on which a portion of wine may be poured, to wash out what remains, by a second pressure. This may be preserved separately as a second sort of wine, or it may be mixed with the first.

The wine from this process will be found of an excellent quality, and will stand in need of no other ingredient to add to its flavour and aroma.

3.—Of Wine from Apricots and Peaches, without fermentation.

We have formerly remarked, that neither of these fruits can be reared cheaply enough in this country, so as to be made into wine that could vie with the highly-prized wines of foreign countries, notwithstanding the heavy duties to which the latter are subjected. As it may happen, however, that some gentlemen, to whom the price is of no consequence, might wish to try the experiment, as a matter of curiosity, we shall extract the memoir of Mons. *Cadet de Vaux* on the subject.

"In a season," says he, "when the apricot was very abundant, I prepared a wine from it by the following process. It was the *apricot peach* I made use of.

"Take the apricot when completely ripe, open it, and take out the stone. Strew it over with sugar, in the manner of a comfit (but only with about an ounce to the pound): to facilitate the separation of its juice, Subject it to coction over a slow fire, for four successive times; and then, on every four pounds of the fruit pour a pint of good white wine, and from three to four pints of brandy.

"Add the wood of the nut, after having taken out the kernel. For this purpose, the shell is broken, and allowed to dry during five or six days in the sun, previously to infusing the broken pieces in the wine.

"At the end of a month, the liquor is passed through a search or straining-bag. If, when thus separated from the *marc*, it be not transparent, it must be put into a vessel with a glass of good milk, and well stirred. The milk will soon curdle, and fall to the bottom, and by its precipitation qualify the *liqueur*. I repeat it:—there does not exist a finer dessert wine; it has the real Muscadel flavour, and is similar to the wine of Lunel."

Peach-wine may be made in a similar manner.

CHAPTER XIV.

OF THE IMITATION OF SWEET WINES FROM UNFERMENTED FRUITS AND SUGAR, OR FROM SUGAR ONLY.

1.—*Of Raisin-Wine, unfermented.*

RAISINS are fitted, more than any other fruit, to make a delicate and pleasant wine, without the trouble of fermentation; and it is in this dried state (which we in this country properly call raisins) that they are best calculated for the purpose. They then contain the excess of *saccharum* which is especially required for the fabrication of sweet wines. On the continent, this class of wines can be made much cheaper than the fermented wines which they are meant to imitate, and are, generally, little inferior in quality; but in this country, owing to the import duties upon the materials, we fear that their manufacture would be subject to the same objections which were stated in the preceding chapter, when speaking of apricots.

The general rule for these imitations, is, to choose raisins of the same kind as those of the wine to be imitated: thus the Muscadine flavour is best acquired from dried grapes of that species; and that of Malaga, from those of Damascus. The following Recipe will serve to shew the method of fabrication, on the continent, where the materials are easily and cheaply procured.

Muscadine-Wine.

Dried Muscadine raisins, 50 pounds—cut;

— flowers of elder, $1\frac{1}{2}$ pounds;

White wine of the required flavour, 80 to 90 bottles.

The whole is allowed to macerate in a cask for several months, keeping the raisins and flowers constantly covered with wine, and the cask closely bunged. The wine is then to be drawn off, and the *marc* pressed; and the two liquids, being mixed together, are left for some time to settle. If it become quite pure, it may be bottled; otherwise it must be clarified by some one of the methods formerly directed.

Malaga-Wine.

This is made in a similar manner, but with a different raisin, as already mentioned. The flowers of the peach are in this case preferred to those of the elder; and the best wine for the purpose is said to be champagne. To give more examples on the subject of the raisin-wines, would be useless in this country; for the materials are too expensive.

2.—Sweet Wines without Fruit, and unfermented.

In order to succeed in this process, it will be well to consider what are the real substances of which those *sweet wines* (or *vins de liqueur*, as the French call them) consist. It is only by imitating the parts that we can hope to imitate the compounded mass. In a general view, the ingredients are :

Water, which existed in the juice of the grape ;

Alcohol, or a fluid of an approximate nature, generated by the partial fermentation which the wines undergo ;

Tartaric acid, which either existed in the grape, or was formed during the fermentation ;

Sugar, or an analogous substance which existed in the grape (perhaps increased by the fermentation), which remains unconverted into wine ; and an

Aroma, which differs with the different varieties of the grape.

These five ingredients must be imitated and proportioned.

The *must* from which those sweet wines are made has been usually raised, by some of the means formerly mentioned, to the gravity of at least fifty pounds per barrel. More than half this gravity disappears during the fermentation; for the wine seldom weighs more than eighteen pounds. From a calculation connected with the principles of distillation, which would be out of place here, it is probable that the alcohol (or its constituent particles) engendered from this diminution of gravity would have amounted to about six gallons; so that a barrel of this wine, which we wish to imitate, should contain six gallons of spirit of wine, or one sixth of its bulk. Let us then make a *must* of thirty pounds gravity per barrel, and add to this a sixth of its bulk of proof spirit; and this, impregnated with a due proportion of tartaric acid, will produce a wine very similar to many of the sweet wines of our importation: it, however, will be flavourless. We have not kept to mathematical exactness in our calculations, but we believe that the average will be found to be effectual in practice. Thus :

6 gallons of water, mixed up with loaf-sugar to the gravity of 30 pounds ;

1 gallon of brandy ; and

7 ounces of cream-of-tartar, previously dissolved in hot water ;

The whole well stirred together.

With respect to flavour, a gallon of good white wine, in which some one of the artificial aromas formerly treated of has been dissolved, would be the best vehicle of communication. Elder-flowers, if used, should be steeped in alcohol or brandy.

Good imitations of several species of Foreign Wine have been made from the juice of Apples and of Pears ; but the manipulations cannot be well managed without some acquaintance with the processes that are required for the manufacture of Cider and Perry. These, even in their usual form, are truly species of wine, and consequently claim a place in our arrangements as original liquors ; while the modes of management, by which they are made to imitate the wines of the continent, owing chiefly to the varied treatment of the fruits and their juice, have little relation to the methods by which factitious wines are usually produced. From these considerations, we refer the reader to the following Appendix.

APPENDIX.

CONCERNING CIDER AND PERRY.

CIDER and PERRY are two kindred species of fermented liquors; the former being manufactured from the juice of apples, and the latter from that of pears. The apple-tree (*Pyrus malus*), and the pear-tree (*Pyrus communis*), have each numerous varieties, all originating from the crab-apple and the wild-pear of the hedges; but the juice of every kind is capable of being fermented, respectively, into cider and perry, though, of course, differing as to the qualities of the several liquors which are produced. Cider is a far more popular drink than perry, and made in much greater quantity. The mode of manufacture is, however, so similar, that by giving a sketch of the process adopted in the one we shall leave little to add when we come to speak of the other.

OF THE MANUFACTURE OF CIDER.

Although apple and pear trees are reared in every part of the island, it is only in the Western counties that the fruit is cultivated solely for the purpose of being fermented into vinous liquors. Herefordshire, Gloucestershire, Worcester-shire, and Monmouthshire, produce perry as well as cider; while Devonshire, with portions of its adjoining counties, is famed for cider alone. Devonshire-cider is distinguished from that of the other counties which we have named; but its peculiarity arises from the nature of the fruit, and not from any difference in the method of manufacture, which is, in both districts, substantially the same. The manipulations of one ciderist may vary in some cases from those of another; but these differences exist as much between the possessors of neighbouring orchards as between those of different counties.

Of the Fruit.

The varieties of the apple that are preferred for cider are seldom such as are fitted for the table. They are required to be juicy, of an acid and aromatic flavour, with a certain

degree of astringency. The latter quality, however, is said not to be prized in Devonshire, where a rich sweet fruit is preferred. Nevertheless, Mr. Knight (a good judge of the subject) informs us, in his Treatise on the Cultivation of Apples and Pears, that the strongest ciders, and he believes the strongest wines, are made from fruits which possess some degree of *astringency*; and, says he, "This quality is so necessary in the pear, that I have never known a single instance in which perry made from fruits that were without it did not become sour before the middle of the succeeding summer. It may be preserved by a mixture of the harsh juice of the crab; and this, I imagine, is effected more by the astringent than by the saccharine matter which the latter contains."

We said that apples most approved for cider were seldom fitted for the table. The *Stire-apple* is, however, a remarkable exception; being not only a tolerably good eating apple, but esteemed as far superior to any other for liquor; the *Stire-cider* frequently fetching four times the price of the common sale kinds. The Golden Pippin, Red-streak, and Woodcock, stand high on the list of cider-apples; and *Cocagee-cider* is famous in Devonshire. The farmers have a belief that their finest old fruit-trees were originally brought from Normandy; but the varieties are many of them "kernel-fruits," that is, fruits from seedling-stocks that have never been grafted. Of these, Mr. Marshall, in his "Rural Economy of Gloucestershire," speaks with enthusiasm of the Hagloe-crab, which would appear to be superior even to the *Stire*.

In general practice, however, cider is seldom the produce of a single variety of the apple. It is convenient, and in a great degree necessary, that the *pommage* should be constituted of several sorts, which ripen at the same time; and, whether to make a virtue of necessity, or from whatever other cause, there are numerous manufacturers who account that liquor preferable which is produced from a mixture of kinds. Some make their cider from apples and pears jointly; and others from sweet apples, mixed with common wild crabs; but these are chiefly for home consumption, where what strangers would term insufferable harshness is accounted a good property. "A palate accustomed to sweet cider," says Mr. Marshall, "would judge the *rough* cider of the farm-house to be a mixture of vinegar, and water, with a little dissolved alum to give it roughness."

The juice of unripe apples contains that viscous substance called *mucus*, or mucilage; along with an acid, termed the *malic*, from the Latin *malum*, "an apple." This acid exists also in other fruits; but it is here that it is found most pure and abundant; as the *citric acid* is in the juice of the lemon, and the *tartaric* in that of the grape. It would seem that the vegetable acids have a great share in turning the insipid mucilage into *saccharum*, in a similar way as starch becomes sugar by the action of sulphuric acid; for as the fruit ripens, it becomes more and more sweet, and the acidity (harsh in the apple) proportionally disappears. In certain fruits, this effect continues after they are separated from the tree. They are ameliorated by time; but the process may be hastened by heat, judiciously applied; as was shewn when treating of raisin and currant wines, and is of every-day observation in roasted apples. We merely premise these remarks, in order that they may be kept in mind, while we detail the particulars of the present practice in the cider counties.

Gathering the Fruit.

This is often done in a very careless and improper way; by which ripe and unripe, of various kinds, are huddled together in the same heap. The more careful, however, take only such fruit as are ready to drop from the tree; letting those remain longer to ripen, which do not fall by slightly shaking the branches. After collecting, for which a dry day is chosen, they are usually put in heaps of ten or twelve inches thick, in the open air, "exposed to the sun and rain, and uncovered, except in very severe frosts." Very airy open sheds might be preferable; but they would require to be very large, and of course very expensive. In these heaps they are left to *mellow*, that is, to acquire an addition of *saccharum* to what they had when taken from the tree. It is from outward appearance only that it can be judged when they have reached the utmost degree of mellowness which they can acquire from this operation; and this is taken for granted, when they have assumed the deepest shade of yellow that can be had, without beginning to decay, so as to shew a dark discoloration on the rind. The apples are then taken from the heap, and all that are green, or rotten, picked out, and thrown away.

Of Grinding.

In former times, the apples were *pounded* with wooden pestles (shod with iron nails), in a strong tub, as apothecaries

bruise their ingredients in a mortar; and this method of procuring the juice is, we are told, still practised in some isolated parts of Cornwall, and in Ireland. The common *horse-mill* of the cider districts is a narrow circular trough, built of stone; in which another round stone, about four feet diameter and twelve inches thick, is made to roll on its edge, crushing the fruit by its weight. This stone on edge is called a *runner*; and in some mills there are two runners, following one another in the same trough, and both driven by the same horse. A similar machine is employed in other places, by tanners, for grinding their bark. The trough is fed with about two bushels of apples at a time. A man, having a female or a boy to assist him, usually grinds, with one horse, between two and three hogsheads of pommage a day; whereas, with the *hand-mill*, which is, notwithstanding, getting much into use, three men can scarcely make a hogshead.

The *hand-mill*—so called because generally wrought by hand, though some of the same construction are drawn by horses—consists of two toothed or indented wooden rollers, of about nine inches diameter, and having a feeding hopper at the top like the rollers for grinding malt. The distance between the cylinders, which are at first set wide apart, can be diminished in a regular manner, from the first cutting of the fruit until the last, when not a kernel escapes; and, by means of another pair of toothed cylinders under the first (which are sometimes employed), the pommage is bruised to any required degree of minuteness.

Pressure of the Pommage.

Different opinions are formed with regard to the time at which the pommage should be submitted to the press; some recommending it to be done immediately from the mill; and others, that it should be kept a day, or two days, to macerate with the rind and kernels (which are supposed to communicate a flavour), and to acquire a colour. The most usual practice is, to allow it to rest twenty-four hours.

The *Cider-press* is very similar to the common packing-press; except in the bottom plank, which is broad, and furnished with a ledging, to prevent the overflow of the juice, which is guided, by an opening, to a cistern below. Formerly the pulp was put between layers of straw, but is now wrapt up in hair cloths, each folded-up square parcel being put above another, until the press is full, containing a pile of ten or twelve. The press is very powerful; but wrought slowly at first,

increasing the pressure gradually. The screw is usually of wood, and nine or ten inches diameter; but iron-screws have been recently introduced, by which closer threads are made with less thickness in the worm.

The quantity of juice differs with the kind of apples; and, in the same species, is less or more, according to the dryness or wetness of the season. At an average, there is required about two hogsheads of fruit to one hogshead of juice. Pears yield about a third more than apples. The specific gravity of cider-juice is usually between 1040 and 1060; which is equivalent to from 14 to 21 pounds per barrel, as weighed by the brewer's saccharometer; being a difference of 50 per cent. between the value of one juice and another. Notwithstanding this immense discrepancy, the liquor for common cider is generally purchased, as it comes from the press, at one indiscriminating price; which is fixed by the dealers at an annual meeting, and usually agreed to by the farmers. The adoption of an instrument would (flavour aside) ascertain the actual value of every hogshead; for the proportion of *saccharum* would be found to correspond with the gravity.

The cakes of pressed pulp (similar to the *marc* of the grapes, and provincially termed *cheeses*) are not exhausted of their *saccharum* by this first pressure: they are often re-ground with water; and these *washings*, as they are called, are again pressed out into a weaker *must*, and fermented apart, for the use of the servants. The fruit sufficient for three hogsheads of cider is generally allowed to make one hogshead of *washings*; and, what is rather surprising, these washings shew nearly the same gravity as the original *must*.

Of the Fermentation.

The cider-liquor is foul and turbid as it issues from the press, and becomes pure only in consequence of the vinous fermentation which it spontaneously undergoes. For this purpose it is put immediately into hogsheads or other casks, which in the ordinary practice are filled to the bung: though some, who pretend to be more judicious, leave a pailful or more of ullage, according to the ripeness of the fruit, filling the casks only when it has been under-ripe. With respect to temperature, says Mr. Marshall, nothing is learnt; for even professional dealers are strangers to the thermometer. Few cider-makers pay any attention to the degree of fermentation. The manufacturers of sweet cider pay a little; but their whole art appears to consist in checking it by every means in

their power, "preventing, as much as they are able, any degree whatever of vinous fermentation."

The time that elapses before the fermentation begins is very irregular and uncertain. If the fruit be imperfectly ripened, and the weather warm, it will sometimes commence in less than twenty-four hours; while, with ripened fruit, or juice of great gravity, it will occasionally remain (especially in cold weather) a fortnight without any appearance of change. "If," says Mr. Knight, "the cask be placed in a vault, or other situation where there is little change of temperature, the fermentation will proceed, till the whole *saccharum* is decomposed, and the liquor is become rough and unpalatable to such as are unaccustomed to it in that state. But, as cider which contains a considerable degree of sweetness is most valuable, much attention is employed to prevent an excess of fermentation. This is usually done by placing the casks in the open air, which is much the most effectual method."

The completion of the first tumultuary fermentation is, like its commencement, effected much sooner in the sour juice than in the mellow, in periods of time from three to four days in the one, to between a week and a fortnight in the other. When it begins to subside, the grosser portions of the pulp (which had been buoyed up to the surface, and continually broken through by the escape of the carbonic acid gas) settles into a crust, covering the liquor, while the lower portion has become in a great degree pure. If regard is had to its subsequent sweetness, then is the time to rack off the clear fluid, into a clean cask, from its lees and scum, which are filtered through bags, in the manner of jelly; and afterwards (if free from acidity) added to the racked liquor. The studied object is, to prevent a second tumultuary fermentation; which would not only destroy its remaining sweet, but might be followed by the acetous, and thereby convert the cider into a sort of mixt vinegar. To guard against this result, the experienced ciderists are continually on the watch; and when they hear the least hissing noise in the cask, they rack it again, an operation which is sometimes found necessary to be repeated a great number of times. If, however, it remains quiet, even after the first racking, "the Herefordshire cider farmers place their casks in open sheds throughout the winter; and, when the spring advances, give the last racking, and then cellar it."

The practice of sulphuring, provincially termed *stunning* (*steaming*), is frequently had recourse to; and is employed

exactly in the same way as we described at page 39, when speaking of its usage in foreign wines. As in that case, too, flavours are occasionally introduced, such as, those of ginger, cinnamon, cloves, &c., by strewing the powdered ingredients upon the sulphured matches. When the vinous fermentation is finished, the stumming is, however, more generally resorted to, merely with the view of suppressing any apparent tendency to a secondary visible fermentation. The insensible fermentation by which the liquor is ameliorated in the cask, neither can, nor ought to be prevented.

Although by far the greater part of cider is fermented in casks, yet there are a few scattered instances of a different practice. In these, the fermentation is carried on in open vessels; such as, wide shallow vats, or casks standing on end with the head out. In these the liquor stands until the first fermentation is over, when the thick surface is either skimmed before the clear liquor is drawn off, or the utmost care is taken, in the racking, that the scum shall gradually subside until it fall upon the lees, without contaminating the purity of the cider. In these methods, probably from having the state of the liquid more under observation, further rackings are seldom found necessary. In some parts of Normandy, the juice, after having undergone, for about three days, a tumultuary fermentation in large tuns, is cleansed into casks, and then left to its fate, without further racking.

OF THE SPRING MANAGEMENT.

In ordinary cases, after two rackings, the cider will require no further attention until the spring; unless now and then filling up the casks to repair the waste occasioned by the exhalation from the open bung-holes. In the month of March it will generally be bright, and fitted for final racking. This, Mr. Crocker, and other writers on the subject, recommend to be done in fair weather; and that, if necessary, a commixture should now be made of the high-coloured cider, made from the Jersey, or the luscious sweet apple, with that of the pale-coloured cider from the poorer sour apples; by which means a general regular colouring may be obtained with the least trouble, and without expense. "Soon after this spring racking, but not till then, the casks may be gradually stopped by first laying the cork on the bung-hole, and in a few days forcing it very tightly into it, covering it over with a layer of melted rosin, or other similar substance."

Some ciders, however, especially those of which the juice

has been rich in *saccharum*, will remain muddy throughout the whole winter; and though, perhaps, they may not be on the fret, will be not only foul, but *stubborn* even in their resistance to finings. In such cases, the same finings are made use of as were mentioned at page 42, when speaking of the clarification of wines; and, generally, the same diseases attack both ciders and wines, and the same nostrums are recommended for their cure. In fining with isinglass, not more than an ounce is allowed to the hogshead at a time; and when that has subsided, the liquor being partially cleared, the dose is repeated until the clarification is perfected. The isinglass, after being bruised in a mortar, is steeped in the liquor till it is expanded like a pulp. It is then mixed up completely with a few gallons of the cider, which is poured into the cask, agitating the whole for two hours, so as it may be perfectly incorporated.

The blood of sheep is made use of in the purification of stained wines; and this, as well as the blood of horned cattle, is occasionally employed as finings by the ciderist: but it is remarked, that the blood of the swine is religiously excluded from the same honour. Cider fined with blood is deprived of all colour, being limpid as water; but the want of colour, in this or other cases, is supplied to any requisite shade by means of *caromel*, which is a colouring made either from moist or lump sugar, in the manner described in the Seventh Chapter of the Second Part of the Art of Brewing: the mode of determining whether or not the foul cider will yield to the blood-finings is the same as that recommended at Section iv. Chapter vi. Part I. of the work just referred to.

However successfully the fermentation may have been conducted, the cider will seldom remain sufficiently mild to please the palates of the London public, for whom *sweet-cider* is chiefly manufactured. Let the ciderist be as attentive as he will, the scanty *saccharum* of the juice is so much attenuated, that the native harshness of the malic acid becomes disagreeably predominant, and is only to be overcome by the injection of an artificial sweet. The sweet generally employed is sugar-candy, which is not so liable to produce a new fermentation as sugar that is less refined. The sugar-candy is introduced previously dissolved in water, the quantity of each being regulated by the taste.

OF THE MANUFACTURE OF PERRY.

The manufacture of perry is conducted, in almost all respects, like that of cider. The fruit is ground and pressed in the same manner, except that the pulp is usually taken immediately from the mill to the press. The juice of the pear is more plentiful than that of the apple; but the management of the liquor is more precarious; so that good perry is always higher in price than cider, in the London market.

The cessation of the tumultuary fermentation, when perry as well as cider should be racked from its lees, is not so distinctly marked in the former as in the latter. The cider carries a head which covers the clear liquor; whereas the perry presents little or no scum, and its body usually continues muddy. The after-fermentation is prevented in the same way as in cider; but it more generally requires to be brightened with isinglass. Perry is subject to mishaps throughout the succeeding summer; which if it escapes, it is usually bottled, to shield it from further danger.

The pears which are reckoned the best for making perry are so excessively harsh and sour, that it is said "even hungry swine will not eat them." Many years ago, when describing the fruit-trees of an old orchard adjoining the ruins of an Abbey in Scotland, we were at a loss to account for the offensive flavour of the fruit of some of the aged pear-trees*. Fruit in that quarter is cultivated solely for the table; and we blamed the taste of the early owners, who had allowed them to encumber the ground; but we were not then aware of the use to which those pears had been destined—that the Monks might have been fond of perry.

We have reason to believe that the superior sorts of perry, as well as of cider, though they may have the same names, are not equal to what were sold for such, forty or fifty years ago. Most of the trees that were famed for the excellence of their produce are either dying or dead. Mr. Marshall published his *Rural Economy of Gloucestershire*, in 1789, at which period he laments the decay of the finest fruit-trees. "All the old fruits," says he, "which raised the fame of the liquors of this county (Herefordshire) are now lost, or are so far on the decline as to be deemed irrecoverable. The *red-streak* is given up; the celebrated *stire-apple* is going off; and the *squash pear*, which has probably furnished this country with more *champagne* than was ever imported into it, can no

* "Memoirs of the Caledonian Horticultural Society," Vol II. page 81.

longer be got to flourish: the stocks canker and are unproductive." The *squash pear* is described as remarkable for the tenderness of its flesh, which bursts (or rather *bursteds*) if allowed to fall ripe from the tree: and hence the name.

The juice of the pear, though more plentiful than that of the apple, presents generally many obstacles to the production of a good, or even of a passable liquor. "Every variety of the apple," says Mr. Knight, "which possesses colour and richness, is capable of making fine cider; but a good perry-pear requires an assemblage of qualities, which will be rarely found in the same fruit. It must contain a large portion of sugar, or its juice can never possess sufficient strength; and, unless it be at the same time extremely *astringent*, the liquor produced from it will be acetous, whenever it ceases to be saccharine. In the latter state, it will agree with few constitutions; in the former, with none. The juice of the best perry-pears is so harsh and rough, as to cause a long-continued heat and irritation in the throat, when the fruit is attempted to be eaten; yet, by being simply pressed from the pulp, it becomes rich and sweet, without more roughness than is agreeable to every palate. This circumstance appears extraordinary; but it does not stand alone in the vegetable world."

The juice of the pear, whatever be the species, contains a much less proportion of the *malic acid* than that of the apple: but this is not the *astringency* which is supposed to be wanting in the preceding quotation, as well as in that at page 112, which we extracted from the same author; otherwise, a mixture of the juice of the crab would be always an effectual preventive. Mr. Knight's *astringent principle* is *tannin*, which, from a theory that he had formed, was an antidote to the formation of vinegar. "If I am right in this conjecture," says he, "it will not appear very improbable that the quality hops possess of preserving malt-liquors, in their vinous state, depends on their containing the *astringent principle*. This is not readily discovered on the palate; but if a plate of polished iron be boiled a few minutes in a strong decoction of them, the loss of its polish, and a black colour communicated to those in contact, seem to evince its presence: the decoction, however, does not act very powerfully on a solution of martial vitriol."

OF THE IMITATION OF FOREIGN WINES FROM APPLES AND PEARS.

The humble gravity of apple-juice (seldom above twenty pounds per barrel), and the harshness of the malic acid, render

much amelioration necessary, before it can be made to imitate any species of wine. The *saccharum* may be increased, either by evaporating the juice when expressed, or by slicing the fruit and submitting it to heat, in a similar way to what was recommended in making currant-wine: and by these means we have known the gravity raised to nearly fifty pounds per barrel; much higher than is requisite for any but sweet wines. About thirty pounds will be sufficient for ordinary wine; and, with this gravity, the *must* will have much of the mixt sweetness of a roasted apple: but if it be attenuated low, the harsh taste of the uncombined malic acid will, probably, again predominate, giving a flavour very unlike what is looked for in wine.

Nevertheless, we believe much cider-wine is made for the adulteration of foreign wine, and particularly of Madeira, with which it more readily assimilates. "It was formerly the custom to boil cider, and sometimes to add spices to it. The object of this process was to make it stronger; and accordingly it was boiled as soon as pressed, and kept scummed continually, till its colour was considerably heightened. This custom has long been disused in Herefordshire; and is continued only in some parts of Devonshire, where the fruit is of an inferior kind, and yields a very poor liquor."—"A great quantity of cider has been boiled down into wine in the county of Somerset*."

We would especially remind the reader, that the boiling down of the juice until it acquires a higher gravity is different from the sort of coction which we recommended in our directions respecting currant-wine. The former increases the gravity, merely by evaporating the aqueous portion; while our object in the latter was really to increase the quantity of *saccharum* (and consequently to decrease the acidity) by the more complete union of the acid with the mucilage. This union is, in a good degree, effected by heat; but the heat most proper for saccharification is below the boiling point.

Perry, when the manufacture has been successful, is much more similar than cider to the white wines of the grape. Without any mixture, it has often been mistaken for the best quality of effervescing champagne. The juice, mixed with an equal quantity of a purified syrup of sugar, or of honey, of about twenty-five pounds gravity, (being allowed to finish its fermentation, so as to be bright before bottling,) is scarcely to be distinguished from a foreign wine of a superior species.

* Dunster's Edition of "Philips's Cider," 1791.

In the north of France, the imitation is made more perfect. "Having," says an experienced amateur, "heated fifty-five pounds of the juice of wild pears to 180 degrees, I added about a tenth of that weight of dried grapes (raisins), and bunged up the whole into a cask. In a short time, the heat of the liquid had fallen to 77 degrees; when I drained out the raisins, bruised them, returned them into the *must*, and closed the cask so as to allow the fermentation to take place. A fortnight after, the wine (or perry) was racked into stone cans; and, after standing for three months in the cellar, it was reckoned, by good judges, equal to the best white-wine from grapes." The same gentleman has furnished us with the following method of improving the juice of pears by coction:—

"Let your fruit be well ground, expressed, and filtrated, as quickly as possible; and then let the juice be kept, during several hours, at a temperature constantly between 160 and 200 degrees, skimming off the feculencies as they arise. Empty the copper now into a wooden vessel, and leave it to cool unto between 110 and 130 degrees; when the liquor is to be racked off, to undergo a second similar coction; and, if the harshness be not then completely gone, the coction is to be repeated a third time. The *must*, being thus purified from its fæces by the several coctions and rackings, should be put into a cask, bung uppermost, but not quite full. It should then be bunged up close, leaving only a peg-hole, for the escape of the gas. The fermentation will soon become tumultuous, on account of the heat and the excess of *saccharum* that has been developed; and the silent fermentation which will succeed may be expected to produce a wine that will improve with age, so as to reward the labour."

A factitious red-wine, made of ripe apple juice, flavoured and coloured with mulberries, is noticed in an early Number of the "Philosophical Transactions," as manufactured in Devonshire; and recommended, in the Cyclopædias, for general adoption, under the name of *Mulberry-wine*; but we have not learnt that it is at present known in that county.

GENERAL OBSERVATIONS.

The malic acid, which prevails in the apple more than in any other fruit, gives that roughness to cider, which prevents it from being generally approved as a liquor, by those who have not been accustomed to it as a beverage. It is on this

account that the manufacturers of sweet cider endeavour to retain as much as they can of the *saccharum*, in an unfermented state, to cover the harshness of the acid. Attempts have been made to deprive the juice of that which strangers reckon a nuisance; but they have never been successful. The malates of metals are generally soluble in the liquor, and, setting aside their deleterious qualities, are unpleasant to the taste; as is known to every one who cuts his apple with a steel knife. The malate of lime is deposited in crystals, if produced in clear water, or a clear liquid; but it is quickly re-absorbed by any additional portion of malic acid which the fluid may contain. About a pint and a half of thin lime-wash has been added, with good effect, to a hogshead of harsh apple-juice; but, in so doing, it was found necessary to rack immediately after the effervescence was over, and the liquor had become partially clear; otherwise it would have become muddy for months after. This dose might be repeated; but the total destruction of the acid, were it possible, would also annihilate all flavour: the liquor would cease to be cider.

Iron, lead, and even stone which contains either iron or calcareous substances, are studiously prevented, in all cider manufactories, from coming in contact with the juice. The Devonshire colic, a violent disease, also once prevalent in Normandy, is now less spoken of. It was long attributed to the solution of the lead which served to clamp the pieces of stone together; but that opinion has been since doubted. "From two or three striking cases of this disorder," says Mr. Marshall, "to which I had an opportunity of paying some attention, it appeared to me to be the joint effect of cider, and of a vile spirit which is drawn by the housewives of Devon from the grounds and lees of the fermenting-room. These dregs are distilled (of course illegally) by means of a porridge-pot, with a tin head over it, and communicating with a straight pipe passing through a hogshead of water; the liquor being passed twice through this imperfect apparatus. It, of course, comes over extremely empyreumatic; and is drank, in a recent state, under the appropriate name of "necessity." The patient having brought on, by an inordinate use of rough corrosive cider, and by the quantity of acid thrown into the habit, a fit of the ordinary colic, has recourse to "necessity," in order to remove the complaint."

“ THE BREWER’S SACCHAROMETER.”

THIS Instrument, made under the directions of the Author of the preceding Work, will be found equally useful to the Wine-maker and the Ciderist, as to the Brewer. It may be had (along with the “Explanation,” price Two Guineas) through the medium of any Bookseller, at Mr. M’GOWAN’S, Gerrard Street, Soho, London.

LONDON :

PRINTED BY R. WATTS, CROWN COURT, TEMPLE BAR.



